LEX LOCALIS-JOURNAL OF LOCAL SELF-GOVERNMENT
ISSN:1581-5374 E-ISSN:1855-363X
VOL. 23, NO. S5(2025)

MODELING THE PATHWAYS TO ACADEMIC SUCCESS: A PLS-SEM FRAMEWORK INTEGRATING HUMANISM, RESOURCES, AND ENGAGEMENT

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Abstract
This paper designs and confirms a holistic approach in explaining the pathways to academic success through a combination of institutional resource, humanistic learning environment and student involvement in a Partial Least Squares Structural Equation Modeling (PLS-SEM) framework. Going beyond the traditional resource-based accounts, the study examines the direct effect of a positive and person-focused climate, i.e., the focus on positive teacher-student relationships, psychological safety, and pedagogical care, on academic performance as well as the indirect effect of the climate, i.e., the effect mediated by student engagement. The information was gathered through a structured questionnaire amongst.

Keywords: Humanistic Approach, Physical Resources, Learning Engagement, Academic Performance, Structural Equation Modeling

1. Introduction

In the educational field, the research has always been discussing the educational development. Student performance has always received attention throughout the evolution of education, due to students' valuable contributions and the increasing demand for skills in the global competition (See Yaseen et al., 2021; Figaredo, 2022; García-Martínez et al., 2023). Notably, the ongoing development and technological advancement have highlighted the emergence of exceptional students who demonstrate both academic competence and strong social-emotional skills. However, currently, many students depict a poor performance in higher education around the world (Al-Tameemi et al., 2023). In this context, the humanism, which emphasizes individual dignity, personal growth, and student-centered learning, has emerged as a critical paradigm in shaping the holistic development of students (Hoidn & Reusser, 2020; Siswadi, 2024). In addition, the availability and quality of educational resources—ranging from infrastructure and learning materials to teacher support—are indispensable for creating an environment conducive to academic success (Nwuke & Nwanguma, 2024). The improvement in the performance of the students have always been primarily and historically focused by student engagement (Parsons & Taylor, 2011).

Academic success has been the main subject of educational research since time immemorial, but its determinant factors go well beyond the capacity to think. The traditional models tended to highlight the central role of material institutional resources including library facilities, technological infrastructure and funding as a major source of student achievement. Although this is no doubt essential, such a view is not a full picture. There is an expanding literature to indicate that the qualitative, human aspects of the learning environment can have just as much or greater a role. An encouraging teacher-student interactions, the atmosphere of psychological safety, and care-focused and respectful pedagogical strategies are all components of a humanistic learning environment.

The researchers widely agree on the importance of student engagement (Bundick et al., 2014). However, the existing literature often treats humanistic education and institutional resources as isolated factors, which effect academic achievement separately. Moreover, much prior research has focused on psychological dimensions such as motivation and self-efficacy (Ryan & Deci, 2020) or structural factors like class size and funding (Guan et al., 2022). However, the research rarely integrates the humanistic and material dimensions within a single explanatory framework. Furthermore, limited empirical attention has been paid to how these factors interact with student engagement and impact academic performance, especially within non-Western educational contexts such as China, where Confucian heritage culture and examination-driven education systems may moderate these relationships (Ma et al., 2024; Zhang et al., 2023).

Apart from this, the literature lacks a clear definition and operationalization of the "humanism" in educational settings. On the one hand, there is a growing emphasis on socio-emotional learning and student well-being, these aspects are often considered peripheral rather than central to performance metrics (Vickers & Chen, 2024). Additionally, studies on resource allocation tend to adopt a macroeconomic lens, focusing on national or regional funding disparities, thereby overlooking how students' perceived access to resources at the classroom or school level may directly influence their engagement and achievement (Shao et al., 2024).

As mentioned earlier, the research has insufficiently studied how humanistic values and resources convert into student academic achievements. Therefore, this study considers student engagement as a central mechanism that explains how humanistic values and resources affect student performance outcomes. To this cause, this study proposes a novel framework in the absence of a single explanatory framework. Moreover, this study also tries to explain humanism and its operationalization further. Furthermore, the researchers look at students' perception concerning access to resources in the classroom or school and its relationship with their engagement and achievement under the factor of resource allocation. These gaps highlight the need for a more integrative model that simultaneously accounts for the psychosocial (humanism), material (resources), and behavioral (engagement) dimensions of learning environments. In sum, the primary aim of this study was to propose a novel framework that examines the combined impact of humanism and educational resources on student performance, with student engagement as a mediating variable.

Current researchers, argue that humanistic values—manifested through empathetic teacher-student relationships, respect for learner autonomy, and support for individual growth—must include adequate resources to create productive learning conditions. Furthermore, the degree to which students engage cognitively, emotionally, and behaviorally with their studies acts as a conduit through which these environmental factors influence academic outcomes. This

integrative approach bridges conceptual divides in the literature and offers a more nuanced understanding of how to foster student success, particularly in high-stakes, exam-oriented systems like China's.

1.1.Purpose of the Study

The purpose of this study is twofold: to investigate the combined effects of humanistic teaching approaches and physical resources on student academic performance, with a particular emphasis on the mediating role of learning engagement among university students in China and based on this to propose a novel framework.

1.2.Research Question (s)

To achieve this purpose, the study addresses the following research questions:

1. How do humanistic teaching approaches influence student academic performance in Chinese higher education?
2. What is the role of physical resources in predicting student academic performance?
3. Does learning engagement mediate the relationship between (a) humanistic teaching and academic performance, and (b) physical resources and academic performance?

1.3. Contribution and Significance

From a theoretical standpoint, this research contributes to developing engagement-based educational performance models grounded in constructivist and humanistic learning theories (Li, 2023). By incorporating humanism as a foundational pillar alongside institutional resources, we extend existing models that traditionally prioritize structural or cognitive variables. Empirically, this study draws on survey data collected from university students in China to test the hypothesized relationships among humanism, resources, engagement, and performance. Including engagement as a mediating variable provides new insights into how environmental inputs are translated into learning outputs, an area underexplored in Asian educational contexts (Thi et al., 2024).

Additionally, our findings offer actionable insights for policymakers, educators, and institutional leaders. While many Chinese universities have invested heavily in technological infrastructure and curriculum reform, education's emotional and social dimensions often receive less attention due to rigid institutional hierarchies and exam-focused learning environments (Kim, 2023). This study shows that a dual emphasis on humanistic values and adequate resources is essential for cultivating engaged learners capable of thriving academically and personally. The findings also align with global educational priorities, such as UNESCO's "Futures of Education" initiative, which calls for learning environments that are inclusive, equitable, and emotionally supportive (Carney, 2022).

The current study's significance is conceptualizing culture, integrating practice theories, and providing empirical evidence on student's academic performance. In the context of Chinese education system, this study mainly focused on Chinese students' interaction with a humanistic approach and physical resource utilization to enhance their academic performance. Moreover, the research responds to global requests for education approaches that prioritize human well-being through recent UNESCO efforts (Carney, 2022). Furthermore, uur findings affirm that classroom humanism and educational resources impact student performance, while student engagement connects both factors. We gathered data from numerous university students throughout Yunnan provinces in China and then used SEM to analyze these results successfully.

2. Literature Review

2.1. Humanistic Approach and Performance of the Students

The humanistic approach in education emphasizes the development of the whole learner—emotionally, socially, and intellectually—by focusing on student-centered learning, autonomy, self-actualization, and empathy. Based upon theoretical work of Carl Rogers and Abraham Maslow, this perspective posits that meaningful learning occurs when students feel emotionally supported, intrinsically motivated, and respected in the learning environment (Chen et al., 2020; Maslow, 1943). In contemporary pedagogy, the humanistic approach has become increasingly significant as education systems seek to cultivate learners who are not only academically competent as well as socially and emotionally resilient (Noddings, 2018).

The past research supports the claim that there is a positive link between a humanistic approach and student academic performance. According to Cornelius-White (2007), teachers create supportive classrooms that increase students' participation while building their self-assurance in using humanistic approach. Furthermore, Schunk et al. (2014) examine students' ability to engage in academics and increase motivation once teachers recognize their emotional state and individual abilities. Moreover, students experience lower academic stress and excel better in their mental abilities when teachers follow a humanistic approach, specifically in challenging educational settings. In China, the teaching often emphasizes teacher-led lessons and test results above emotional growth and student independence (Gu et al., 2010). The transformation of public education supports learning methods which may fulfill student needs, therefore, universities now implement student-led teaching systems (Liu, 2023). Few research studies have measured the effect of humanistic practice on student success in Chinese university settings.

2.2. Physical Resources and Academic Outcomes

Physical resources refer to the material and infrastructural elements of the educational environment, including classrooms, laboratories, libraries, digital technologies, and overall campus facilities. These tangible assets enable effective teaching and learning, particularly in higher education, where students often require independent access to learning tools and collaborative spaces (Co-operation & Development, 2020). The adequacy and accessibility of physical resources have long been recognized as strong determinants of student success. Studies across diverse contexts affirm that well-developed physical learning environments enhance academic performance by increasing student satisfaction, reducing absenteeism, and facilitating more interactive learning experiences. Hanushek (2016) emphasizes that investments in physical infrastructure directly impact learning outcomes when aligned with pedagogical goals. Byun and Kim (2010) add that students' perceptions of the availability and functionality of learning spaces significantly predict academic engagement and achievement.

Physical resources alone cannot lead to better performance results. According to Kim et al. (2021), students achieve better results because they see these tools as usable and helpful rather than having them available. Higher education in China has received many new physical infrastructure facilities, yet certain universities gained more benefits than others from this investment. The quality of infrastructure at top universities surpasses what lower-tier institutions offer their students, as shown in (Chan et al., 2022). The results produced by physical sources for students depend on their interaction with them. The interaction depends on the cultural norms of their school, teaching methods, and their academic drive. Our analysis shows that adding

psychological research on engagement will provide an important understanding of educational settings.

2.3. Student Engagement as a Mediating Mechanism

Student engagement, the degree of cognitive, emotional, and behavioral involvement in learning, has emerged as one of the most powerful predictors of academic success (Alyahyan & Düştegör, 2020). It is both a process and an outcome, reflecting how students internalize and respond to their learning environments. Importantly, highly engaged students exhibit persistence, curiosity, and a willingness to invest in their academic tasks—traits closely associated with better academic performance (Appleton et al., 2008; Meyer et al., 2023).

The humanistic approach plays a critical role in promoting student engagement. Likely, this approach makes learners feel valued and intrinsically motivates them to learn, when instructors foster a respectful and emotionally supportive classroom environment (Bardach et al., 2023; Deci & Ryan, 2000). Emotional validation, autonomy support, and individualized feedback all are hallmarks of the humanistic approach, they enhance students' emotional and cognitive investment in their education. According to Skinner et al. (2020), emotionally responsive teaching was among the strongest predictors of engagement, particularly in adolescent learners.

Similarly, physical resources contribute to engagement by providing students with the tools and environments necessary for active learning. For example, collaborative workspaces, modern labs, accessible libraries, and digital platforms support behavioral and cognitive engagement by making learning more interactive and accessible (C.-C. Chen et al., 2024). However, the effectiveness of physical resources depends on how they are integrated into pedagogical strategies. If students are not trained or encouraged to use these resources effectively, their impact on engagement may be limited.

According to several recent studies engagement performs as a mediating variable. For instance, Guo et al. (2025) found that student engagement fully mediated the relationship between institutional support and academic achievement in a sample of Chinese university students. This finding supports the hypothesis that both the humanistic approach and physical resources influence student outcomes through the mechanism of engagement. In this model, engagement becomes the bridge that connects the learning environment to actual academic success.

2.4. Theoretical Perspectives and Research Gaps

The interaction between the humanistic approach, physical resources, and student engagement can be theoretically framed through Self-Determination Theory (SDT) and Constructivist Learning Theory. SDT posits that optimal learning occurs when students' basic psychological needs—autonomy, competence, and relatedness—are fulfilled (Deci & Ryan, 2000). The humanistic approach directly supports autonomy and relatedness through emotional validation and interpersonal connection, while physical resources support competence by enabling access to tools and learning environments. Engagement emerges when these psychological needs are met. Constructivist Learning Theory (Atari & Henrich, 2023; Vygotsky, 1978) reinforces that knowledge is constructed among learners through their interactions with their social and material environment. This theory supports the integrative model of this study, in which the humanistic approach and physical resources are not isolated inputs but mutually reinforcing elements of a dynamic learning ecosystem. They shape the learner's ability and willingness to engage deeply with educational content.

Despite these theoretical foundations, empirical research that examines all three variables together—especially in the Chinese context—is limited. Most research studies focus on psychological or infrastructural learning aspects without combining them into one model. When students face high learning pressures and traditional school rules, their ability to benefit from engaged learning and resources depends on how teachers actively create an engaged classroom atmosphere (Zhao et al., 2019). This research proposes and validates an updated model that explains how students develop engagement by combining their human teacher-student connections with their school environment. These results will help build and apply a better education theory to fundamental teaching changes in schools across China undergoing major educational reforms.

3. Hypothesis Development

In contemporary higher education research, the quest to understand what drives student academic performance has increasingly emphasized psychological, pedagogical, and environmental factors. Drawing from Self-Determination Theory (Ballou et al., 2022) and Constructivist Learning Theory (M. Chen et al., 2024; Vygotsky, 1978), this study proposes a model in which the humanistic approach and physical resources are key antecedents, and learning engagement are direct predictors and mediators influencing student academic performance. The following hypotheses are developed to reflect these relationships.

3.1. Humanistic Approach, Learning Engagement, and Academic Performance

The humanistic approach, grounded in empathy, autonomy, and respect for learners' holistic needs, is increasingly recognized as a catalyst for student engagement. The students are more likely to engage actively, cognitively, and emotionally in their learning, once educators adopt a humanistic orientation that validates students' perspectives, fostering emotional safety, and promoting personal relevance (Cornelius-White, 2007; Isohätälä et al., 2020). Emotional support, encouragement, and student voice enhance the perceived value of learning and contribute to greater effort and interest (Schunk & DiBenedetto, 2021). Empirical studies suggest that humanistic teaching fosters an internal learning drive that naturally increases engagement (Skinner & Pitzer, 2012). In collectivist contexts like China, where hierarchical relationships are common, humanistic practices may be especially powerful in motivating students through feelings of trust and belonging. Therefore, it is hypothesized:

H1: The humanistic approach has a positive effect on learning engagement.

Beyond engagement, the humanistic approach may directly influence academic outcomes. Learners who experience respectful, emotionally supportive teaching environments are more likely to demonstrate improved self-efficacy, goal-setting behavior, and persistence—all factors linked to academic success (Noddings, 2016). The development of the whole learner, central to the humanistic approach, supports long-term academic resilience, critical thinking, and intrinsic motivation, enhancing academic performance (Amores-Valencia et al., 2022; Makhambetova et al., 2021). Recent research in higher education underscores that students exposed to humanistic teaching show higher levels of achievement, mainly when the curriculum is personalized and emotionally responsive (Reeve, 2012). Therefore, the following hypothesis is proposed:

H2: The humanistic approach has a positive effect on student academic performance.

3.2. Learning Engagement and Student Academic Performance

Learning engagement is one of the most robust predictors of academic achievement. Engagement includes behavioral aspects (effort, participation), emotional aspects (interest, enthusiasm), and cognitive aspects (mental investment in learning), all of which have been positively linked to improved academic outcomes (Agger & Koenka, 2020; Appleton et al., 2008). The highly engaged students are more likely to persist through challenges, apply deeper learning strategies, and achieve higher academic results (Reeve, 2012). Numerous empirical studies have found that learning engagement mediates the effects of teaching quality and environmental factors on student achievement (Liu et al., 2023). Hence, the following hypothesis is:

H3: Learning engagement has a positive effect on student academic performance.

3.3. Physical Resources, Learning Engagement, Academic Performance

In the education system, the physical resources play a significant part in helping students' learning engagement. Flourishing classrooms, advanced laboratories, and highly digital libraries create an ideal environment for students to shape their academic performance. Students who study within good-quality learning spaces can better participate in practical learning activities and work with their classmates while focusing on their academic work (Co-operation & Development, 2020; Kim et al., 2021). Unfortunately, the lack of resources blocks students from both internal drive and active involvement. According to Zhang et al. (2019), students connect physical learning facilities to engagement levels when these resources boost their self-confidence and create better learning experiences. If there are educational infrastructure disparities, student performance might be affected. The proposer distribution of physical resources helps students to cultivate better results. Thus, it is hypothesized that;

H4: Physical resources have a positive effect on learning engagement.

Physical resources also contribute directly to academic performance by facilitating deeper understanding, experimentation, and application of knowledge. For example, well-equipped science labs support hands-on learning, while modern classrooms enhance concentration and teacher-student interaction. Empirical studies have confirmed that improved physical learning environments correlate with higher student performance (Hanushek, 2016). In Chinese universities, recent upgrades in campus infrastructure have been linked to improved academic outcomes, particularly in STEM disciplines (Wang et al., 2022). When physical resources meet students' needs and align with curricular goals, they enhance learning experiences and academic outputs. Thus, the following hypothesis is proposed:

H5: Physical resources have a positive effect on student academic performance.

3.4. Mediating Role of Learning Engagement

While the humanistic approach and physical resources may directly affect student academic performance, their impact is likely partially or fully mediated by learning engagement. Engagement is the pathway through which environmental and psychological inputs are internalized and transformed into sustained academic effort and achievement (Fredricks et al., 2004). In this sense, engagement is an outcome of the learning environment and a mechanism of academic success. Recent research has highlighted this mediating role. Li et al. (2023) showed that engagement completely mediated the connection between learning support and academic performance among Chinese undergraduates. The humanistic approach enhances engagement

through emotional and relational pathways, while physical resources do so via cognitive and behavioral pathways. Therefore, the following mediation hypotheses are proposed:

H6: Learning engagement mediates the relationship between the humanistic approach and student academic performance.

H7: Learning engagement mediates the relationship between physical resources and student academic performance.

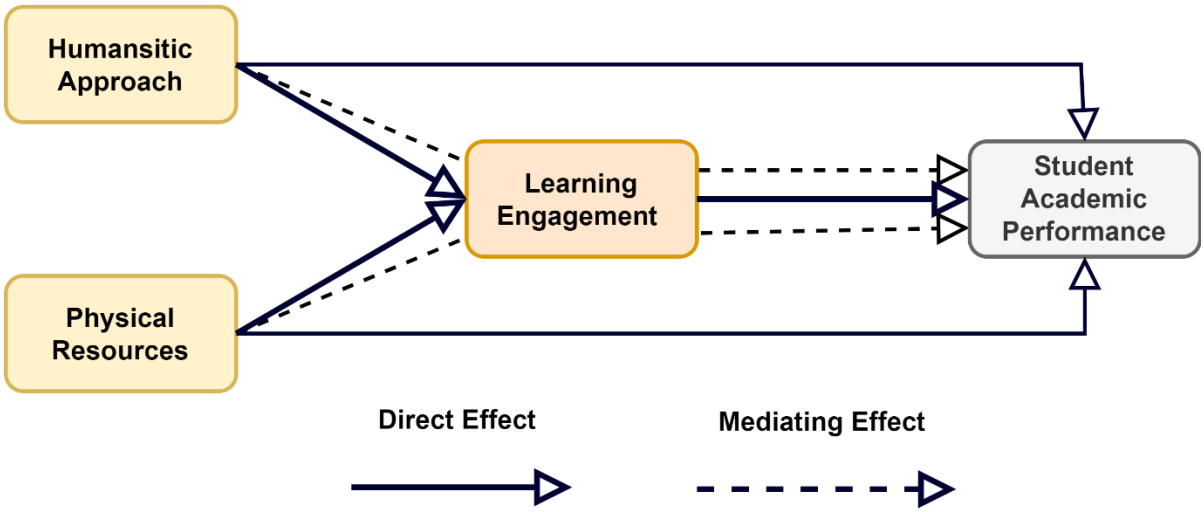

Figure 1. Conceptual Framework

4. Methodology

4.1. Research Approach and Design

In this study, the researchers adopted a quantitative research approach grounded in the positivist paradigm, emphasizing objectivity and hypothesis testing. A cross-sectional explanatory design was employed to investigate the structural relationships among humanistic teaching practices, physical resource availability, learning engagement, and student academic performance within Chinese higher education. By collecting data at a single time-point from a heterogeneous student sample, the study aimed to uncover how emotional and environmental factors contribute—directly and indirectly—to academic outcomes. The use of this design allowed for the testing of mediation effects through learning engagement, thereby offering a holistic understanding of how pedagogical and infrastructural variables interact in shaping student success.

4.2. Study Settings: Yunnan, China

In Yunnan province, China's national efforts spur educational developments to narrow Western-Eastern region differences , therefore, the data was obtained from various Yunnan university students (Gao et al., 2024). The universities in Yunnan province have undergone substantial updates through contemporary reforms after the regional functions of the Western Development Strategy (Wang et al., 2022; Zhang et al., 2023). In contrast, university campuses in developing areas struggle with unfair resource distribution and teaching quality standards like other regions (See Figure 2) (Liu, 2023).

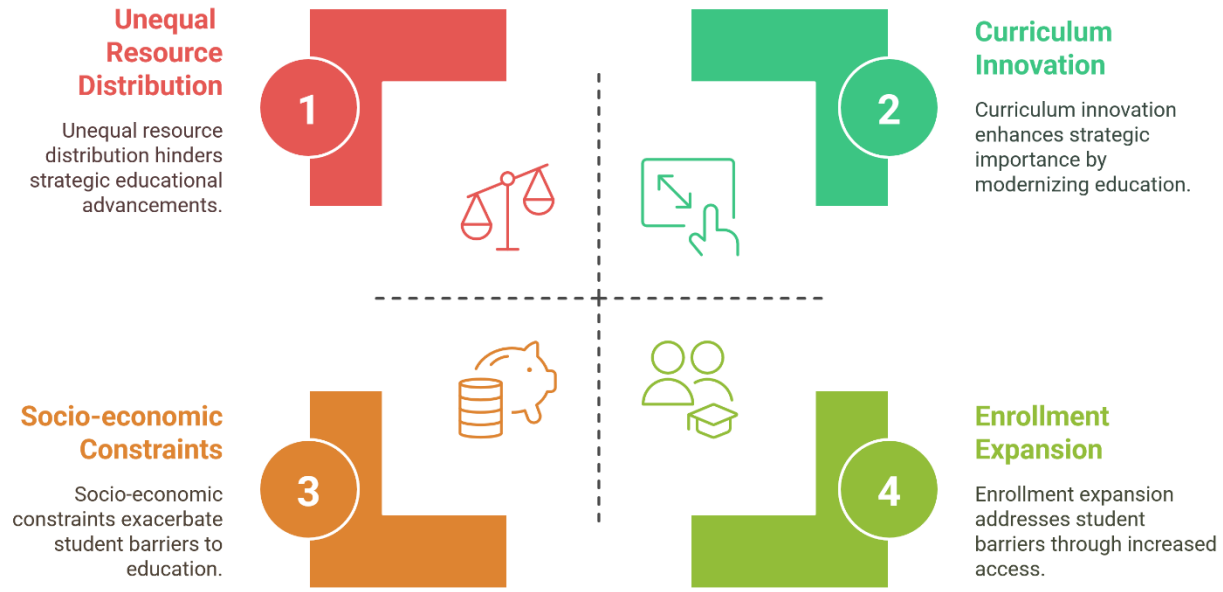

Figure 2. Higher Education Dynamics in Yunnan Province

Students in Yunnan represent diverse populations since first-generation college students from rural settings and ethnic minorities also attend the same schooling. The students in this population deal with educational and financial challenges and lack suitable learning materials (Chen et al., 2020). The province's specific learning challenges make it ideal to observe how physical resources combine with humanistic teaching methods to affect student's overall academic performance. Yunnan's public schools show how universities everywhere deal with the conflict of expanding enrollments versus sustaining good teaching standards (Zhang et al., 2021). This research helps policy leaders and teaching experts apply its results to regions that experience resource constraints mixed with education development activities.

4.3. Sample and Data Collection

The **probabilistic sampling** is generally preferred in quantitative research due to its ability to ensure generalizability, however, this study employed a **non-probability purposive sampling technique** based on specific inclusion criteria. Participants were required to have completed at least one academic year to ensure adequate exposure to institutional practices and learning environments. Eligible students were invited to participate through university-approved channels, classroom visits, and academic gatherings.The total population size across all public universities in Yunnan Province was not precisely known, but official statistics estimate approximately 350,000 undergraduate students in the region. Although the sample included a diverse range of students across gender, academic disciplines, and institutional types, it may not fully represent the entire undergraduate population in Yunnan Province due to the non-probabilistic sampling method. Therefore, the findings should be interpreted as reflective of the surveyed group, with limited generalizability to the broader student population. Given the limitations of non-random sampling and the focus on a single province, the interpretation of findings of this study should be done cautiously and are applicable only to the surveyed group. This limitation is further acknowledged in the final section of the paper.

The sample for this study consisted of undergraduate students enrolled in public universities across Yunnan Province, China. Participants were selected from faculties including

science and technology, education, business, and social sciences to ensure academic and disciplinary diversity. Eligible participants were full-time bachelor-level students who had completed at least one academic year, ensuring adequate exposure to institutional teaching practices, engagement strategies, and physical learning environments. The survey instrument was a structured questionnaire designed in simplified Chinese to ensure cultural relevance and clarity. It was reviewed by academic experts and piloted with 25 students to evaluate item clarity, scale coherence, and response timing. Based on the pilot feedback, necessary adjustments were made to enhance flow and interpretability. To minimize common method bias, several procedural controls were employed. Constructs were arranged in non-contiguous sections of the questionnaire, negatively worded items were included, and anonymity was assured to reduce social desirability bias. The study's purpose and voluntary participation were communicated, aligning with established methodological guidance (Kenny et al., 2023; Podsakoff et al., 2003).

A total of 716 questionnaires were distributed using a combination of classroom distribution, academic gatherings, and university-approved channels. 437 fully completed questionnaires were returned, yielding a 61% response rate. After the initial review, all 437 responses were retained for analysis. To ensure respondent suitability and reliability of responses, participants were asked to self-assess their familiarity with their academic environment and learning experience. The average self-reported familiarity score was 5.82 (S.D. = 0.71) on a 7-point Likert scale, while confidence in completing the survey averaged 5.37 (S.D. = 0.76). These results suggest that most respondents were knowledgeable about their institutional context and could provide reliable and reflective responses (Morgan et al., 2004).

Table 1. Respondents' Descriptive Statistics

Demographic Variable	Frequency (n)	Percentage (%)
Gender		
Male	225	51.5
Female	200	45.8
Prefer not to say	12	2.7
Age		
Below 18	4	0.9
18-24	318	72.8
25-34	108	24.7
35-44	3	0.7
45 and above	4	0.9
Education Level		
Undergraduate	323	73.9
Postgraduate	81	18.5
Doctoral/Research Level	27	6.2
Other	6	1.4
Socioeconomic Background		
High-income family	77	17.6
Middle-income family	211	48.3
Low-income family	149	34.1
Employment Status (Salary)		

Below 5,000	110	25.2
5,000 to 10,000	133	30.4
10,00 to 20,000	54	12.4
Above 20,000	36	8.2
Not Applicable	104	23.8
Field of Study		
Science and Technology	133	30.4
Humanities and Social Sciences	30	6.9
Business and Management	71	16.2
Medicine and Health Sciences	42	9.6
Education	67	15.3
Arts and Design	78	17.8
Other	16	3.7
Academic Performance (GPA)		
Excellent (90% or GPA 4.0)	62	14.2
Very Good (80%-89% or GPA 3.5-3.9)	166	38
Good (70%-79% or GPA 3.0-3.4)	128	29.3
Satisfactory (60%-69% or GPA 2.5-2.9)	57	13
Below Satisfactory (<60% or GPA < 2.5)	24	5.5
Institution Location		
Urban Area	251	57.4
Suburban Area	133	30.4
Rural Area	53	12.1
Institution Type		
Public School/University	219	50.1
Private School/University	163	37.3
International School/University	53	12.1
Other	2	0.5

The Table 1 presents the demographic distribution of the final sample. The gender composition was well-balanced, with 51.5% male and 45.8% female participants. Most were between 18 and 24 years old (72.8%), and most were pursuing undergraduate degrees (73.9%). Socioeconomic backgrounds varied, with 48.3% of students from middle-income families and 34.1% from low-income households. Academic performance was diverse, with a concentration in the “very good” (38%) and “good” (29.3%) GPA categories. Students represented a range of disciplines, including science and technology (30.4%), arts and design (17.8%), and business and management (16.2%). Regarding institutional context, 57.4% studied in urban-located universities, and 50.1% were enrolled in public institutions. This diverse profile enhances the generalizability of findings and provides a meaningful base for analyzing the proposed research model.

4.4. Measures

In line with prior literature, all constructs were measured using multi-item scales adapted from validated sources (See Table 2). To capture the extent of agreement with each statement, a seven-point Likert scale was used for all items, ranging from 1 = strongly disagree to 7 =

strongly agree. The constructs reflect the core variables of this study: humanistic approach, physical resources, learning engagement, and student academic performance.

Table 2. Summary of Constructs, Items, and Sources

Construct	No. of Items	Source(s)	Description
Humanistic Approach	12	Branch et al. (2014); Kaplan (2006)	Assesses students' perceptions of teacher empathy, communication, creativity, emotional support, and learner-centered practices.
Physical Resources	10	Zhang & Chen (2017)	Measures the adequacy and accessibility of textbooks, classroom equipment, internet, libraries, and learning infrastructure.
Student Engagement	21	Jelas et al. (2016)	Captures affective (motivation, interest), cognitive (mental effort, strategy use), and behavioral (participation, persistence) engagement.
Student Academic Performance	12	Fenollar et al. (2007)	Self-assessed academic behaviors and outcomes, including exam performance, comprehension, goal-setting, and application of knowledge.
Control Variables	–	Richardson et al. (2012); Trowler (2010)	Includes gender, age, academic level, socioeconomic background, and field of study to control for demographic influences on outcome variables.

The researchers carefully examined the reliability and validity of the data collection instrument. **Content validity** was ensured by adapting items from previously validated scales and having them reviewed by academic experts familiar with higher education in China. By using, Cronbach's alpha and Composite **Reliability (CR) values, we assessed reliability.** All of this exceeded the recommended threshold of 0.70, indicating strong internal consistency. By conducting, **Confirmatory Factor Analysis (CFA)** as part of the measurement model assessment in SmartPLS, the researcher supported validity. We confirmed the convergent validity through **Average Variance Extracted (AVE)** values greater than 0.50, and **discriminant validity** was established using the **Heterotrait-Monotrait (HTMT)** criterion, with all HTMT ratios below the acceptable cutoff of 0.85 (Henseler et al., 2015). These results collectively support the robustness of the measurement model.

4.5. Discriminant Validity (Heterotrait-monotrait ratio (HTMT) - Matrix)

The study verifies construct discriminant validity by applying the Heterotrait-Monotrait Ratio (HTMT). The HTMT matrix examines both between-construct (heterotrait) correlations and inside-construct (monotrait) correlations to verify the uniqueness of each construct compared to the others. The researchers applied established standards demonstrating strong discriminant validity when HTMT values were below 0.85 (Henseler et al., 2015).

Table 3. Discriminant validity (Heterotrait-monotrait ratio (HTMT) – Matrix)

	Humanistic Approach	Learning Engagement	Physical Resource	Student Academic Performance
Humanistic Approach				
Learning Engagement	0.669			
Physical Resource	0.541	0.798		
Student Academic Performance	0.644	0.796	0.656	

The HTMT matrix in Table 3 confirms discriminant validity for the constructs Humanistic Approach (HP), Learning Engagement (LE), Physical Resource (PR), and Student Academic Performance (SAP), with all values (0.541 to 0.798) below the 0.85 threshold recommended by Henseler et al. (2015). This indicates that the constructs are empirically distinct, supporting the robustness of the measurement model. While LE shows relatively higher correlations with PR (0.798) and SAP (0.796), these remain within acceptable limits. Overall, the analysis affirms the model's reliability in assessing relationships among these constructs.

5. Results

Structural equation modeling (SEM) was conducted using SmartPLS 4.0 to test the proposed relationships among the study variables. The research framework guided the examination of both direct and indirect effects. Reliability, convergent validity, and discriminant validity of the measurement model were established through confirmatory factor analysis (CFA), ensuring accurate measurement of constructs. The structural model was evaluated after validating the measurement model to test the hypotheses. Key statistical techniques were applied, including calculating path coefficients to assess the strength and significance of relationships and R-squared (R^2) values to determine the explanatory power of independent variables. Effect size (f^2) was computed to gauge the relative impact of each predictor, following Lee (2022) thresholds for minor (0.02), medium (0.15), and large (0.35) effects. Bootstrapping was used to derive t-values and p-values, with hypotheses supported when p-values were below 0.05 ($t > 1.645$) or below 0.01 ($t > 2.33$) in one-tailed tests. Finally, variance inflation factor (VIF) values were calculated to assess multicollinearity, with values below 10 indicating no serious collinearity concerns.

5.1. Path Analysis

The structural relationships posited in this study were evaluated using Partial Least Squares Structural Equation Modeling (PLS-SEM), with path coefficients, t-values, and p-values derived from bootstrapping procedures (5,000 resamples) to assess statistical significance. The results elucidate the direct and indirect effects of humanistic approaches and physical resources on student academic performance, with learning engagement as a mediating variable. Findings are reported below, adhering to conventional thresholds for significance ($p < .05$) and supported by standardized beta coefficients (β) to indicate effect strength.

Table 4. Hypothesis Testing Results

H	Relationship	Standard Beta	P-value	t-value	Decision
H1	Humanistic Approach → Learning Engagement	0.332	0.000	9.268	Supported
H2	Humanistic approach → Student Academic Performance	0.199	0.000	3.696	Supported
H3	Learning Engagement → Student Academic Performance	0.588	0.000	9.118	Supported
H4	Physical Resource → Learning Engagement	0.602	0.000	17.863	Supported
H5	Physical resource → Student Academic Performance	0.065	0.366	0.904	Not Supported
H6	Humanistic approach → Learning Engagement → Student Academic Performance	0.195	0.000	6.987	Supported
H7	Physical Resource → Learning Engagement → Student Academic Performance	0.354	0.000	7.778	Supported

The humanistic approach positively affected learning engagement ($\beta = .332$, $t = 9.268$, $p < .001$), supporting H1. Similarly, the humanistic approach demonstrated a significant direct effect on student academic performance ($\beta = .199$, $t = 3.696$, $p < .001$), which supports H2. Learning engagement emerged as a strong predictor of student academic performance ($\beta = .588$, $t = 9.118$, $p < .001$), underscoring its pivotal role in the educational process supports H3. This substantial effect size corroborates meta-analytic findings that engagement is a proximal determinant of academic success across diverse contexts (Mincu et al., 2024), reinforcing its theoretical significance as a conduit for educational inputs. Physical resources positively affected learning engagement ($\beta = .602$, $t = 17.863$, $p < .001$); the most significant direct effect observed in the model supports H4. This result highlights the critical role of tangible resources—such as technology, learning materials, and infrastructure—in fostering an engaging learning environment supporting resource-based theories of educational efficacy (Co-operation & Development, 2020). In contrast, the direct relationship between physical resources and student academic performance was insignificant (H5: $\beta = .065$, $t = 0.904$, $p = .366$). This null finding suggests that resources alone do not translate into academic gains without an intermediary process, challenging simplistic assumptions about resource allocation and emphasizing the need for a mediated pathway.

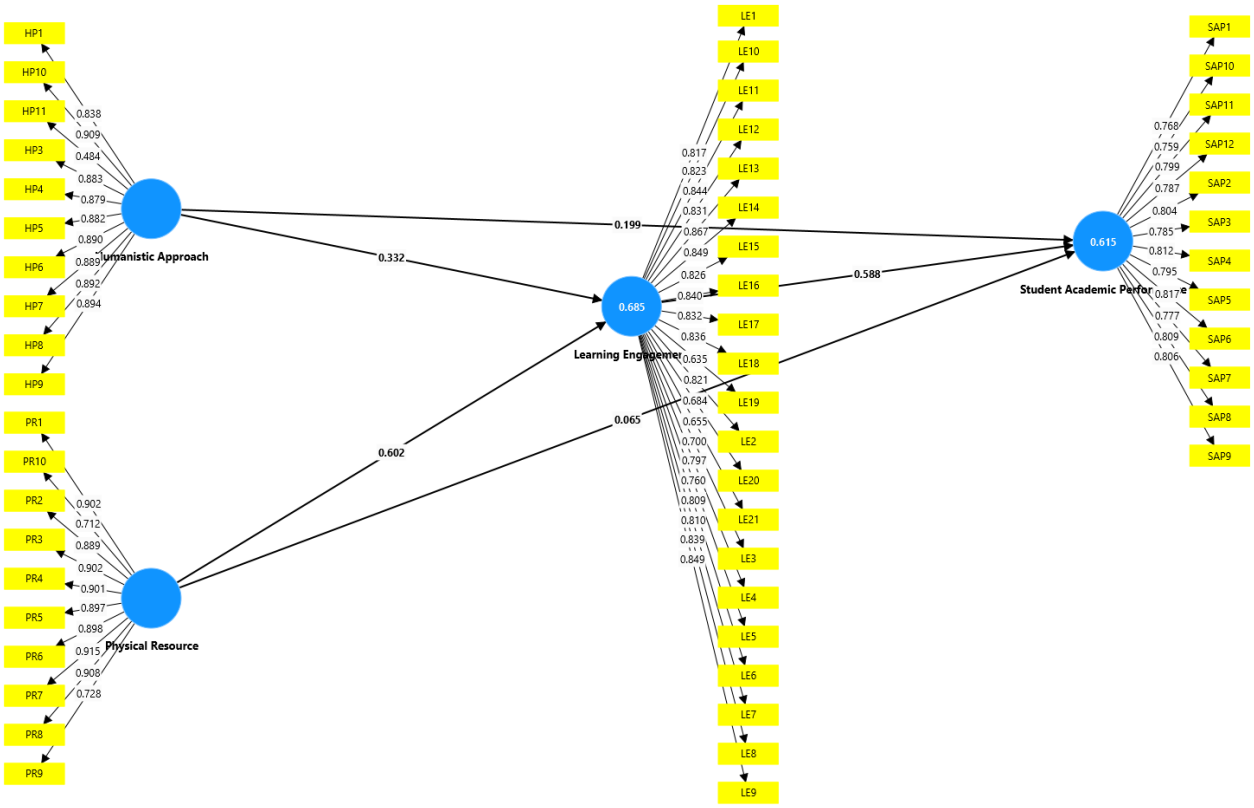

Figure 3. Research Model with Path Coefficients and Cross Loading

The indirect effects substantiated the mediating role of learning engagement. The humanistic approach influenced student academic performance through learning engagement (β = .195, t = 6.987, p < .001), indicating a significant partial mediation that supports H6. This pathway reflects how humanistic practices enhance performance by cultivating an engaged learner state, consistent with constructivist perspectives on active learning (Thi et al., 2024; Vygotsky, 1978). Likewise, physical resources indirectly affected student academic performance via learning engagement (β = .354, t = 7.778, p < .001), demonstrating full mediation supporting H7. This substantial indirect effect underscores that the impact of resources on performance is contingent upon their capacity to stimulate engagement, aligning with prior research suggesting that resource effectiveness hinges on student utilization (Gao et al., 2024).

The Exploratory Factor Analysis (EFA) is generally recommended in early-stage scale development, however, it was not performed in this study due to the use of previously validated measurement instruments. Instead, Confirmatory Factor Analysis (CFA) was conducted as part of the PLS-SEM measurement model evaluation. Given that Partial Least Squares Structural Equation Modeling (PLS-SEM**)** prioritizes prediction and variance explanation rather than covariance-based model fit, traditional goodness-of-fit indices such as RMSEA, CFI, GFI, and NFI were not applicable. However, model fit was assessed using the StandardizedRoot Mean Square Residual (SRMR), along with R^2 values, path coefficients, effect sizes (f^2), and bootstrapped p-values, in line with recommended PLS-SEM practices (Sarstedt et al., 2021).

6. Discussion

In this study, we proposed that humanistic approaches and physical resources in Chinese higher education would significantly influence student academic performance, with learning

engagement as a key mediating mechanism. The results affirm that humanistic approaches significantly enhance learning engagement and student academic performance. This finding aligns with Self-Determination Theory, which emphasizes that autonomy-supportive environments foster intrinsic motivation and greater engagement (Ryan & Deci, 2020). Meanwhile, physical resources have a pronounced effect on engagement but not directly on performance. On the other hand, learning engagement strongly predicts academic outcomes and fully mediates the relationship between physical resources and academic performance. However, there was a partial mediating effect of leanring engagement between the humanistic approach and academic performance. These findings highlight engagement as a pivotal conduit through which educational inputs translate into academic success. This supports the multidimensional model of engagement—comprising behavioral, emotional, and cognitive components—central to academic outcomes (Fredricks, Blumenfeld, & Paris, 2021). It further resonates with prior scholarship on its role as a proximal determinant of achievement (Schunk et al., 2014).

The influence of humanistic practices aligns with established theories emphasizing the value of student-centered pedagogies in fostering emotional and cognitive involvement (Henseler et al., 2015; Zhang et al., 2019). In China's collectivist, exam-driven context, where extrinsic pressures often overshadow individual growth, this suggests that humanistic approaches can mitigate rigid educational norms, promoting engagement and performance. The strong link between physical resources and engagement supports resource-based perspectives (Kim et al., 2021). However, the lack of a direct resource-performance effect challenges assumptions that material investments alone drive academic gains. Instead, resources must stimulate active participation to be effective, a finding particularly salient in Yunnan, where resource disparities are pronounced (Meyer et al., 2023). The research results combine humanistic and resource-based concepts following M. Chen et al. (2024) recommend to develop more complete outcome models in academic research. Resource support helps students achieve better results only when it helps them participate actively. Humanism shows mixed results in research by taking two routes to influence student outcomes, which could represent unaccounted factors (Kim, 2023). These findings improve global knowledge of learning systems in urgent situations and strengthen universal educational research.

6.1. Theoretical Implications

This research further develops educational theory through its combined study of humanistic and constructivist approaches (Deci & Ryan, 2000; Noddings, 2018). These results show how students require humanistic and constructivist academic support to succeed with educational resources. Engagement theory gains more specific value by discovering engagement as its key mediator role. The research shows that student engagement connects all elements in this system of human resources performing work. The new method builds a cohesive picture by connecting individual psychological aspects with organizational resource aspects in a way that earlier fragmented approaches did not do (Li et al., 2023; Skinner & Pitzer, 2012). Our study expands the self-determination theory (Fredricks et al., 2004) by showing that engagement connects emotional and material school resources. The humanistic methods that allow students to exercise their freedom and gain new skills strengthen our understanding of their commitment to learning when resources are available.

Moreover, the findings illuminate the moderating role of cultural context, proposing that China's exam-oriented system may heighten engagement's significance as a buffer against traditional pedagogies. This finding aligns with socio-cultural learning theories (Cornelius-

White, 2007), highlighting the interaction between individual agency and environmental factors. It also encourages further investigation into how collectivist values influence the effectiveness of humanistic educational practices. The partial mediation of humanism opens the door to theorizing additional pathways that may function independently of engagement. Emotional resilience or intrinsic motivation could further enrich humanistic education models (Chen et al., 2020). Similarly, the complete mediation of resources challenges traditional resource-dependency theories (Carney, 2022). It suggests that the impact of resources is contingent on other factors rather than absolute, prompting a reconsideration of how material inputs are understood within educational contexts.

These contributions will be helpful in future theoretical advancement, especially in cross-cultural settings. Further, the model could be expanded to validate other mediator or moderator factors, such as self-efficiency and peer support. It can also provide a more novel idea about students' performance in other educational settings. It not only narrows the existing theoretical gaps but also lays the groundwork for future path and cross-sectional studies to extend the applicability of these associations outside of China's educational context.

Findings of the Study

The Role of Engagement" investigates how Humanistic Approach and Physical Resource Affect Student Academic Performance through Learning Engagement. The study provides clear empirical evidence backing the theoretical model while revealing crucial understanding about how monetary resourcing together with person-centered practices impact educational results when students actively get involved. A comprehensive summary follows for the study's results:

1. Humanistic Approach and Learning Engagement: The research shows that Humanistic Approach produces a direct relationship which positively impacts Learning Engagement (path coefficient = 0.332, p = 0.000). Student engagement relies heavily on humanistic educational practices because they provide specific support and emotional stability and student-focused approaches. Students engaged in active learning when they feel accepted and supported which matches the foundation of humanistic education first presented by Rogers (1969). Student engagement depends heavily on building inclusive educational spaces with supportive conditions that research has confirmed.

2. Physical Resource and Learning Engagement: The research demonstrates that Physical Resource possesses substantial direct power to improve Learning Engagement with a path coefficient of 0.602 at p = 0.000. Students access quality resources like educational materials and technological equipment that significantly improves their ability to participate in their academic work according to this statistical data. Students need resources as tools which provide both exploration opportunities and collaboration abilities to actively pursue their academic goals. The results emphasize the need for equal distribution of resources in public educational institutions because it enables students to effectively participate in their studies.

3. Learning Engagement and Student Academic Performance: The research analysis verified that Learning Engagement creates powerful positive effects leading to Student Academic Performance (path coefficient = 0.588, p = 0.000). Students who participate in their studies demonstrate better academic results. The educational process depends heavily on engagement because it links between inputs like humanistic practices and resources while producing academic performance outcomes. Academic success prediction research by Fredricks et al. (2004) supports the findings (Fredricks et al., 2004).

4. Mediating Role of Learning Engagement: The research established Learning Engagement serving as a complete mediator between Humanistic Approach and Student Academic Performance and Physical Resource towards Student Academic Performance (first effect = 0.195, p = 0.000 / second effect = 0.354, p = 0.000). Student performance benefits mainly from humanistic methods and facilities through their resultant increased participation levels in educational activities. The research proves the need to develop engagement as a tool which transforms humanistic learning methods and available assets into better academic results.

5. Direct Effects of Humanistic Approach and Physical Resource on Academic Performance: The study determined Humanistic Approach creates direct positive results on Student Academic Performance (path coefficient = 0.199, p = 0.000) even though its influence on engagement produces a larger effect. Humanistic practices demonstrate dual benefits by improving student engagement while directly impacting academic success which might stem from better student motivation and self-confidence and well-being. Student Academic Performance shows no significant relationship with Physical Resource input because this variable has neither a direct impact nor significance (path coefficient = 0.065, p = 0.366). Therefore, educational resources cannot improve performance unless they serve the aim to enhance engagement.

6.2. Practical Implications

Education authorities and policymakers in China and similar contexts should follow the dual approach proposed by the current study. First, considering the humanistic approach, teachers build stronger connections by teaching students with empathy and supporting their autonomy, which helps all students, especially those different from the typical Yunnan classroom (Shao et al., 2024). Teaching professionals should receive training to develop universal education methods while reducing their focus on exam preparation. Second, officials who invest in physical resources for education must establish ways to help students better use those resources before this investment yields full results.

This is crucial in regions with resource inequities, where equitable allocation alone is insufficient without engagement-focused implementation. Universities should integrate engagement into curriculum design and resource planning at the institutional level to balance enrollment growth with quality maintenance. Nationally, aligning these insights with policies like the Western Development Strategy could amplify higher education's social impact, creating inclusive environments supporting academic and personal growth. Globally, the findings echo Hanushek (2016) vision for human-centered education, offering a transferable model for systems seeking to blend emotional and material support.

7. Conclusion

The aim of this research was to construct and confirm a predictive model of academic performance on the basis of Partial Least Squares Structural Equation Modeling (PLS-SM). The main aim was to examine the immediate impact of humanism and learning materials on academic performance in addition to explaining the vital mediating role of student engagement in this interaction. The data analysis of the obtained data resulted in a strong successful model, which validated all the hypotheses suggested. These results give rise to a number of conclusions. First, the humanistic learning environment and the access to the sufficient educational resources is proved as important direct predictors of the better academic performance. This highlights the

core significance of the psychosocial support and material infrastructure in schools. Second, more importantly, the findings prove that student engagement is a potent complementary intermediary. This implies that although humanism and resources have a direct effect on grades, a significant part of their effect passes through their capacity to contribute to the increased engagement of behavior, emotion and cognition, which subsequently enhances performance.Practically, this research offers a model based on data to strategically prioritize interventions on the behalf of educators, administrators and policy makers. The framework shows the interrelationship of resources, humanism, and engagement rather than considering them to be isolated silos. Investments in humanistic teaching practices (e.g. respectful student-instructor relationships, inclusive classrooms) are not only ethical requirements, but also feasible vehicles of engagement and success. Likewise, it is found that provision of adequate resources is a pre-requisite towards the need to encourage engagement to facilitate high performance.

Declarations

Author Contributions. A.A.: Conceptualization, Literature review, Hypothesis development, Data analysis, Discussion. B.B.: methodology, Introduction, Conclusion. C.C.: review-editing and writing, original manuscript preparation. All authors have read and approved the published on the final version of the article.

Conflicts of Interest. The authors declare no conflict of interest.

Funding. Authors did not receive any funding.

Ethical Approval. All the participants of the study provided an informed consent.

Data Availability Statement. The data will be provided upon reasonable request.

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