



ORIGINAL ARTICLE

ENHANCING COLLEGE STUDENTS' COMPETENCIES THROUGH COURSE ASSESSMENT, STUDENT ACTIVITIES, AND TEACHING SERVICES: EVIDENCE FROM A CHINESE PRIVATE UNIVERSITY

Pengfei Cui¹, Bity Salwana Alias^{*1}, Salleh Amat¹

¹Faculty of Education, Universiti Kebangsaan Malaysia, Bangi, Selangor 43600, Malaysia

* Corresponding author: Bity Salwana Alias, Bity@ukm.edu.my

Received: Jul 7, 2025; **Accepted:** Aug 28, 2025; **Published:** Sep 11, 2025

ABSTRACT

The enhancement of students' general and professional competencies has become a key indicator of educational quality in higher education. This study investigates the influence of course assessment, student activities, and teaching services on competence enhancement, drawing on the customer satisfaction theory (ACSI) and expectation disconfirmation theory (EDT). Using 5,853 valid questionnaires collected from undergraduates at a Chinese private university, we constructed an empirical model to examine the relationships among these factors. Reliability and validity analyses confirmed the robustness of the measurement instruments (Cronbach's $\alpha = 0.958$; cumulative variance explained = 88.9%). Pearson correlation and multiple regression analyses revealed that all three factors significantly and positively affect students' perceived enhancement of general and professional competencies ($R^2 = 0.848$, $p < 0.01$). Among them, student activities demonstrated the most substantial impact, highlighting the pivotal role of the "second classroom" in fostering comprehensive skills such as leadership, teamwork, and communication. The findings validate the applicability of ACSI and EDT in educational contexts and emphasize the importance of diversified course assessments and high-quality teaching services in promoting student development. This study offers theoretical insights and practical implications for higher education reform, particularly for private universities seeking to optimize curriculum evaluation, strengthen student engagement, and improve service quality.

Keywords: competence enhancement; course assessment; student activities; teaching services; private university

INTRODUCTION

In the era of global transformation in higher education, improving students' general and professional competencies has become a crucial indicator for evaluating the effectiveness of talent cultivation. The shift from a quantity-oriented to a quality-driven educational paradigm, especially under the Outcome-Based Education (OBE) framework, emphasizes not only the mastery of disciplinary knowledge but also the development of critical thinking, problem-solving, teamwork, and leadership. In China, the Ministry of Education has further highlighted the concept of "value-added evaluation" in its 2021–2025 review scheme, urging universities to assess how educational processes enhance students' comprehensive abilities rather than focusing solely on academic achievements. Against this backdrop, research on the factors influencing competence enhancement has gained increasing attention.

Prior studies have consistently shown that three key dimensions—course assessment methods, student activity participation, and the quality of teaching management and services—play pivotal roles in shaping students' learning outcomes and personal growth¹. Diverse and process-oriented assessment models can stimulate continuous learning and creativity. At the same time, extracurricular activities, often referred to as the "second classroom," serve as an essential platform for developing interpersonal and leadership skills. Similarly, efficient teaching services and support systems create a favorable learning environment that strengthens students' motivation and engagement. However, existing empirical research on the combined effects of these three dimensions remains limited, especially in the context of Chinese private universities. Most prior studies either focused on single factors or conducted macro-level policy analysis, leaving a gap in micro-level evidence that connects student satisfaction with measurable competence enhancement.

Harbin Cambridge University, as a representative private institution with strong curriculum innovation and extracurricular programs, provides an ideal setting for exploring this relationship. To address these gaps, this study employs a large-scale questionnaire survey ($n = 5,853$) and statistical modeling to examine how course assessment, student activities, and teaching services jointly affect students' self-perceived improvement in general and professional competencies. By integrating customer satisfaction theory (ACSI) and expectation disconfirmation theory (EDT), this research aims to develop a comprehensive explanatory framework for understanding competence enhancement and to provide practical insights for quality improvement in private higher education.

2. Literature Review

The enhancement of students' competencies has evolved into a critical measure of educational quality in higher education worldwide. Competence enhancement is often defined as the process through which students acquire, develop, and integrate a wide range of knowledge, skills, attitudes, and values that enable them to succeed in academic, professional, and social environments¹. This multidimensional concept includes both general competencies—such as critical thinking, problem-solving, communication, collaboration, and creativity—and professional competencies that are specific to students' fields of study². Recent studies highlight that universities must move beyond the narrow evaluation of knowledge acquisition to adopt holistic approaches that consider how educational experiences shape students' comprehensive abilities and personal development^{3,4}. Internationally, a growing body of research has employed value-added approaches to assess student competencies by comparing outcomes at different points in the learning journey². For instance, the National Survey of Student Engagement (NSSE) and related longitudinal studies have shown that student engagement—both in and out of the classroom—significantly predicts improvements in competencies over time¹. In the Chinese context, the Ministry of Education has integrated the “value-added evaluation” concept into national quality assurance frameworks (MOE, 2021), emphasizing that universities must evaluate not only academic performance but also how effectively they foster students' general and professional abilities during their studies⁵. Despite its importance, the determinants of competence enhancement remain underexplored, particularly in private universities. While prior research has examined aspects such as curriculum design, teaching innovation, and learning support services, few studies have systematically assessed the combined influence

of course assessment, student activities, and teaching services on students' self-perceived competence growth⁶. This study builds upon the existing literature to fill this gap. Course assessment is widely acknowledged as a powerful tool for influencing students' learning behaviors, motivation, and competence development⁷. Traditional summative assessments—typically in the form of final exams—often prioritize rote memorization and knowledge reproduction, which may not adequately foster higher-order thinking or real-world problem-solving abilities. In contrast, formative and process-oriented assessment approaches, such as project-based learning, case analysis, peer evaluation, and continuous feedback mechanisms, have been shown to improve critical thinking, collaboration, and innovation significantly^{8,9}.

International studies emphasize that diversity in assessment methods not only improves academic outcomes but also contributes to students' confidence and lifelong learning attitudes. For example, research by Bahadur et al. (2024)¹⁰ demonstrates that when students perceive assessment methods as transparent, fair, and constructive, their motivation to engage in deep learning increases substantially. Similarly, in the context of Chinese higher education, Zhuang and Liu (2022)¹¹ argue that curriculum reforms emphasizing formative assessment and real-world application tasks have led to measurable improvements in students' problem-solving and teamwork skills. Moreover, course assessment is not merely an evaluation mechanism but also a pedagogical strategy for guiding learning. Elliott and Healy (2018)¹² suggest that well-designed assessments can act as “learning scaffolds,” providing students with structured opportunities to apply theoretical knowledge, reflect on their progress, and develop competencies that are transferable to professional contexts. Therefore, understanding students' satisfaction with course assessment is crucial for identifying how assessment systems contribute to the value-added enhancement of both general and professional competencies. Student activities, often conceptualized as the “second classroom,” play a fundamental role in complementing academic curricula and fostering holistic student development¹³. These activities—ranging from campus cultural events, volunteer services, and academic competitions to student clubs and entrepreneurship projects—provide students with opportunities to develop soft skills such as leadership, teamwork, communication, and time management.

Astin's (2017)¹⁴ student engagement theory underscores the importance of active participation, arguing that the time and effort students devote to extracurricular activities strongly correlates with their learning outcomes and personal growth. International

evidence supports this view: studies conducted in the United States, Europe, and Asia show that students who participate actively in non-academic activities demonstrate higher self-confidence, stronger interpersonal relationships, and better career readiness^{15,16}.

In the Chinese context, extracurricular programs have received renewed emphasis under the “Three-Wide Education” model, which integrates ideological education, academic learning, and practical experiences to cultivate well-rounded graduates⁵. However, while the value of the second classroom is widely acknowledged, few empirical studies have quantitatively examined how satisfaction with student activities directly impacts students’ perceived enhancement of general and professional competencies in private universities. Teaching services and administrative support are essential for creating an environment conducive to student learning and personal development. According to Elliott and Shin (2002)¹⁷, educational service quality encompasses factors such as accessibility of learning resources, responsiveness of administrative staff, timeliness of feedback, and overall student support systems. When students perceive teaching services as reliable, efficient, and student-centered, they are more likely to experience a sense of belonging and satisfaction, which in turn positively influences their motivation and competence growth¹⁸.

In Chinese private universities, teaching services often include digital learning platforms, online consultation, academic advising, and extracurricular support, all of which have been increasingly adopted to improve teaching efficiency and responsiveness¹⁹. For example, Chen et al. (2023)²⁰ found that the integration of online feedback systems and interactive teaching tools significantly enhanced students’ academic satisfaction and engagement. Yet, empirical evidence on how students’ satisfaction with teaching management and services contributes to competence enhancement remains limited.

This study draws upon customer satisfaction theory (ACSI) and expectation disconfirmation theory (EDT) to frame the relationship between institutional practices and students’ perceived competence enhancement^{21,22}. ACSI highlights the role of perceived quality and value in shaping satisfaction, while EDT posits that satisfaction arises when actual experiences exceed prior expectations. By applying these theories to higher education, student satisfaction with course assessment (X1), student activities (X2), and teaching services (X3) can be conceptualized as

key mediators that influence competence growth (Y).

While previous research has examined these dimensions individually, few studies have explored their combined effects within a single, integrated model. Moreover, existing literature is dominated by research on public universities, leaving a knowledge gap concerning private institutions in China, which have unique characteristics in curriculum design, teaching practices, and student engagement strategies. To address these gaps, this study constructs a three-dimensional analytical model. It proposes hypotheses to test the joint effects of X1, X2, and X3 on Y, thereby extending the application of ACSI and EDT in educational contexts. Building on the literature review and theoretical foundations of the American Customer Satisfaction Index (ACSI) and Expectation Disconfirmation Theory (EDT), this study conceptualizes course assessment (X1), student activities (X2), and teaching services (X3) as key institutional factors influencing students’ perceived enhancement of general and professional competencies (Y). Prior studies have shown that these factors can significantly affect students’ satisfaction and development outcomes (Kuh, 2020; Elliott & Shin, 2020). However, their relative impact remains unclear, particularly in the context of Chinese private universities. To address this gap, the study proposes the following hypotheses:

H1: Satisfaction with course assessment methods (X1) has a significant positive impact on students’ perceived enhancement of general and professional competencies (Y).

H2: Satisfaction with student activity participation (X2) has a significant positive impact on students’ perceived enhancement of general and professional competencies (Y).

H3: Satisfaction with teaching management and services (X3) has a significant positive impact on students’ perceived enhancement of general and professional competencies (Y).

H4: Among the three factors (X1, X2, X3), student activity participation (X2) exerts the most substantial positive influence on students’ competence enhancement (Y).

The conceptual framework (Figure 1) illustrates the hypothesized relationships among X1, X2, X3, and Y. The model assumes that all three factors positively influence Y, with X2 expected to have the most significant standardized regression coefficient.

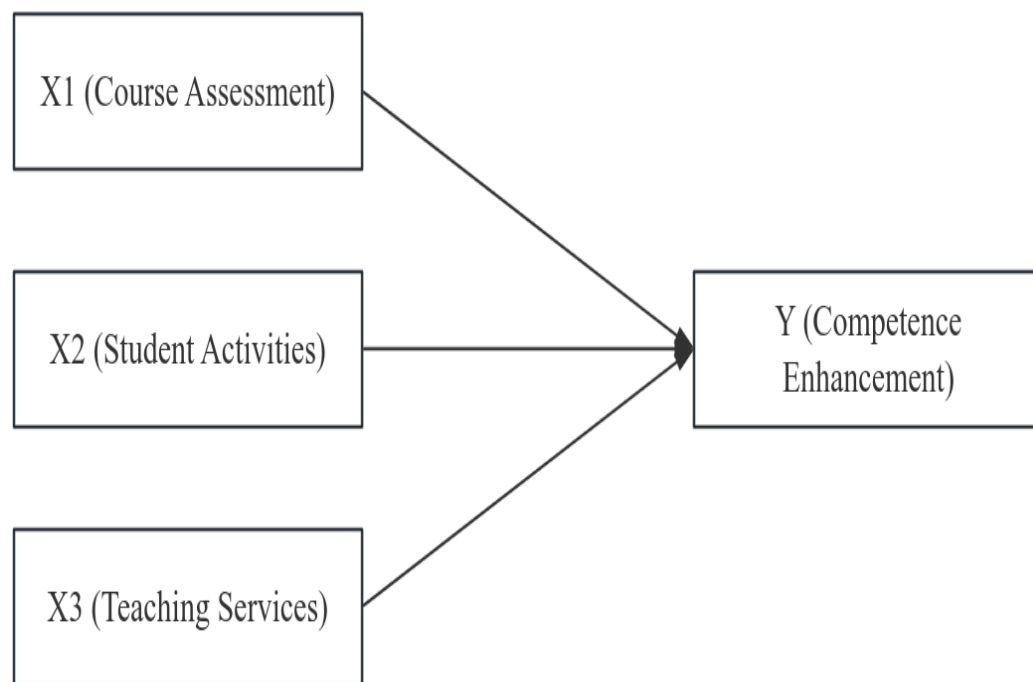


Figure 1. Research Conceptual Model

3. MATERIALS AND METHODS

3.1 Research Design and Subjects

This study adopts a quantitative research design to explore how course assessment (X1), student activities (X2), and teaching services (X3) influence students' perceived enhancement of general and professional competencies (Y). A structured questionnaire survey was administered to undergraduate students from the 2020, 2021, and 2022 cohorts of Harbin Cambridge University, a representative private university in China known for curriculum innovation and active student engagement programs.

A stratified sampling strategy was employed to ensure the representativeness of the sample across grades and majors. A total of 7,200 questionnaires were distributed, and 5,853 valid responses were collected, yielding an effective response rate of 81.29%. Among the respondents, 26.1% were male and 73.9% were female. By grade, 34.4% were from the 2020 cohort, 34.1% from the 2021 cohort, and 31.6% from the 2022 cohort, indicating a well-balanced sample structure.

3.2 Questionnaire Design and Variable Measurement

The questionnaire was designed based on a comprehensive review of established scales and frameworks, including the **American Customer Satisfaction Index (ACSI)**²¹, the **SERVQUAL model**²³ and student engagement frameworks¹. To ensure content validity, the initial draft underwent expert review by three educational scholars and two specialists in survey design. A pilot test (n = 150) was then conducted to refine wording, eliminate redundant items, and improve clarity.

The final questionnaire comprised four sections, each corresponding to one latent construct: **Y (Competence Enhancement)**: Measures students' self-perceived improvement in general abilities, professional skills, and overall competencies. **X1 (Course Assessment Satisfaction)**: Evaluates students' satisfaction with the diversity, fairness, and formative aspects of course evaluation systems. **X2 (Student Activity Participation Satisfaction)**: Assesses students' engagement in extracurricular activities such as cultural events, volunteer services, and competitions. **X3 (Teaching Management and Service Satisfaction)**: Reflects students' perceptions of teaching support, administrative efficiency, and responsiveness of feedback mechanisms.

All items were rated on a **5-point Likert scale** (1 = very dissatisfied, 5 = very satisfied) to ensure consistency and comparability of responses.

3.3 Test of reliability and validity

Reliability Analysis: Internal consistency was assessed using Cronbach's α . The overall α value was 0.958, with all constructs exceeding the threshold of 0.9, indicating excellent reliability and stability.

Validity Analysis: The structural validity of the instrument was evaluated through the **Kaiser-Meyer-Olkin (KMO)** test and Bartlett's test of sphericity. The KMO value was 0.868, and Bartlett's test was significant at $p < 0.01$, confirming the suitability for factor analysis. Principal Component Analysis (PCA) showed that the cumulative variance explained reached 88.9%. All factor loadings were above 0.9, further demonstrating strong construct validity.

3.4 Data collection and analysis methods

Data were collected via the **Wenjuanxing** online platform, which ensured efficient distribution and retrieval of responses. Invalid or incomplete questionnaires were excluded.

The data analysis was conducted using **SPSS 27.0**, following these steps: **Descriptive Statistics:** To summarize demographic information (gender, grade). **Reliability and Validity Testing:** To verify the measurement properties of the questionnaire. **Correlation Analysis:** Pearson correlation coefficients were calculated to examine relationships between X_1 , X_2 , X_3 , and Y . **Multiple Regression Analysis:** A regression model was built to test the hypotheses and evaluate the explanatory power of the three factors. **Model Fit and Residual Analysis:** Residual histograms and VIF statistics were used to confirm normality and multicollinearity assumptions.

The regression model is formulated as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

4. RESULTS

4.1 Descriptive Statistical Analysis

A descriptive analysis was performed to outline the demographic characteristics of the sample. Among the 5,853 valid respondents, 1,529 (26.1%) were male and 4,324 (73.9%) were female. By grade distribution, students from the 2020 cohort accounted for 34.4% ($n = 2,011$), the 2021 cohort accounted for 34.1% ($n = 1,995$), and the 2022 cohort accounted for 31.6% ($n = 1,847$) (see Tables 1 and 2).

The balanced distribution across gender and grade levels indicates that the dataset adequately represents the undergraduate population of Harbin Cambridge University, ensuring reliability for subsequent statistical analysis.

Table 1. Gender distribution Statistics

	Frequency	Percentage	Effective percentage
male	1529	26.1	26.1
female	4324	73.9	73.9
Total	5853	100	100

Table 2. Distribution Statistics of Grades

	Frequency	Percentage	Effective percentage
Grade 2022	1847	31.6	31.6
Grade 2021	1995	34.1	34.1
Class 2020	2011	34.4	34.4
Total	5853	100	100

4.2 Reliability and Validity analysis

(1) Reliability analysis

Cronbach's α reliability test was performed on the questionnaire using SPSS 27.0. The results showed an overall alpha value of 0.958, greater than 0.9, indicating extremely high internal consistency and reliability of the questionnaire (see Table 3).

Table 3. Cronbach's α reliability test Results

Cronbach Alpha	Number of items
0.958	4

(2) Validity analysis

By KMO and Bartlett's sphericity test, the KMO value was 0.868, the Bartlett test approximate chi-square value was 26,651.254, and the significance level was less than 0.01, indicating that the data were suitable for factor analysis (see Table 4).

Principal component analysis results showed that the cumulative variance contribution rate reached 88.9%, which could effectively explain most of the variable information (see Table 5). In addition, the factor loadings for each dimension were all greater than 0.9, verifying the good structural validity of the questionnaire (see Table 6).

Table 4. Results of the KMO and Bartlett's sphericity tests

KMO sampling appropriateness measure	0.868
Bartlett sphericity test	Approximate chi-square
	26651.254
	Degrees of freedom
	6
	Saliency
	<0.01

Table 5: Total variance interpretation Rate

Componen ts	Initial eigenvalues	Extract the sum of squares of the loads.				
	Total	Percentage of variance	Cumulative %	Total	Percentage of variance	Cumulati ve %
1	3.557	88.924	88.924	3.557	88.924	88.924
2	0.191	4.776	93.7			
3	0.146	3.659	97.359			
4	0.106	2.641	100			

Table 6 Component Matrix (Factor Loading)

Variables	Loadings
Y	0.954
X1	0.945
X2	0.944
X3	0.928

4.3 Correlation Analysis

The results showed that the three independent variables (X1: Course Assessment Satisfaction, X2: Student Activity Participation Satisfaction, X3: Teaching Management Satisfaction) were all significantly and positively correlated with the dependent variable (Y: Value-added of General and Professional Abilities) ($p < 0.01$) (see Table 7). Specifically, the correlation coefficient between satisfaction with course assessment methods and satisfaction with student ability enhancement was $r = 0.873$, the correlation coefficient between satisfaction with student activity participation and satisfaction with student ability enhancement was $r = 0.889$, and the correlation coefficient between satisfaction with teaching management and service was $r = 0.836$.

Table 7. Pearson Correlation Coefficient Matrix

		X1	X2	X3	Y
X1	Pearson Correlation r	1	847 * *	845 * *	873 * *
	Significance (two-tailed)		<0.01	<0.01	<0.01
X2	Pearson Correlation r		1	823 * *	889 * *
	Significance (two-tailed)			<0.01	<0.01
X3	Pearson Correlation r			1	836 * *
	Significance (two-tailed)				<0.01

These results preliminarily support H1-H3, suggesting that improvements in course assessment methods, student activities, and teaching services are all associated with higher perceived competence enhancement.

4.4 Regression analysis results. To validate the research hypothesis, this study established multiple linear regression models with student ability enhancement satisfaction as the dependent variable and satisfaction with course assessment methods (X1), student activity participation satisfaction (X2), and teaching management and service satisfaction (X3) as independent variables.

(1) Model

Fit The R^2 value of the regression model was 0.848, indicating that the three types of independent variables could account for 84.8% of the variation in student competency enhancement satisfaction, indicating a high model fit (see Table 8).

Table 8. Regression Model Fit (R^2 Values)

Model Summary				
Model	R	R squared	Adjusted R-squared	Error in standard estimates
1	.921 ^a	.848	.848	.265

(2) The F value of the ANOVA

The regression equation is 10,903.366, and the significance level is less than 0.01, indicating that the overall regression model is statistically significant (see Table 9).

Table 9. ANOVA Analysis of Variance Results

ANOVA ^a					
Model	Sum of squares	Degrees of freedom	Mean square	F	Significance
Regression	2301.106	3	767.05	10903.366	.000 ^b
Residual	411.468	5849	.070		
Total	2712.574	5852			

(3) Regression coefficient test

The results of the regression coefficient test show that all three types of independent variables have a significant positive impact on the dependent variable ($p < 0.01$), among which:

The regression coefficient $\beta = 0.334$ for X1 means that for every additional unit, the satisfaction with student ability enhancement increases by 0.334 units; The regression coefficient $\beta = 0.451$ of X2 is the most influential factor; The regression coefficient $\beta = 0.160$ for X3 also showed a positive promoting effect.

In addition, the variance inflation factor (VIF) of each variable was all below 5, indicating that the problem of multicollinearity was not significant. Based on the results, the regression equation for this study is:

$$Y = 0.058 + 0.334X_1 + 0.451X_2 + 0.160X_3$$

Table 10. Regression Coefficients Table

Coefficients							
Variables	Unstandardized coefficients		Standardized coefficient	t	Significance	Collinearity statistics	
	B	Standard error	Beta			Tolerance	VIF
(Constant)	.058	.008		7.147	.000		
X1	.334	.011	.335	30.501	.000	.215	4.653
X2	.451	.010	.466	45.017	.000	.242	4.128
X3	.160	.010	.170	16.475	.000	.245	4.082

(3) Residual analysis of the model

Verified the normality and good fit of the regression residuals through the residual histogram (see Figure 1), indicating that the assumptions of the model are valid.

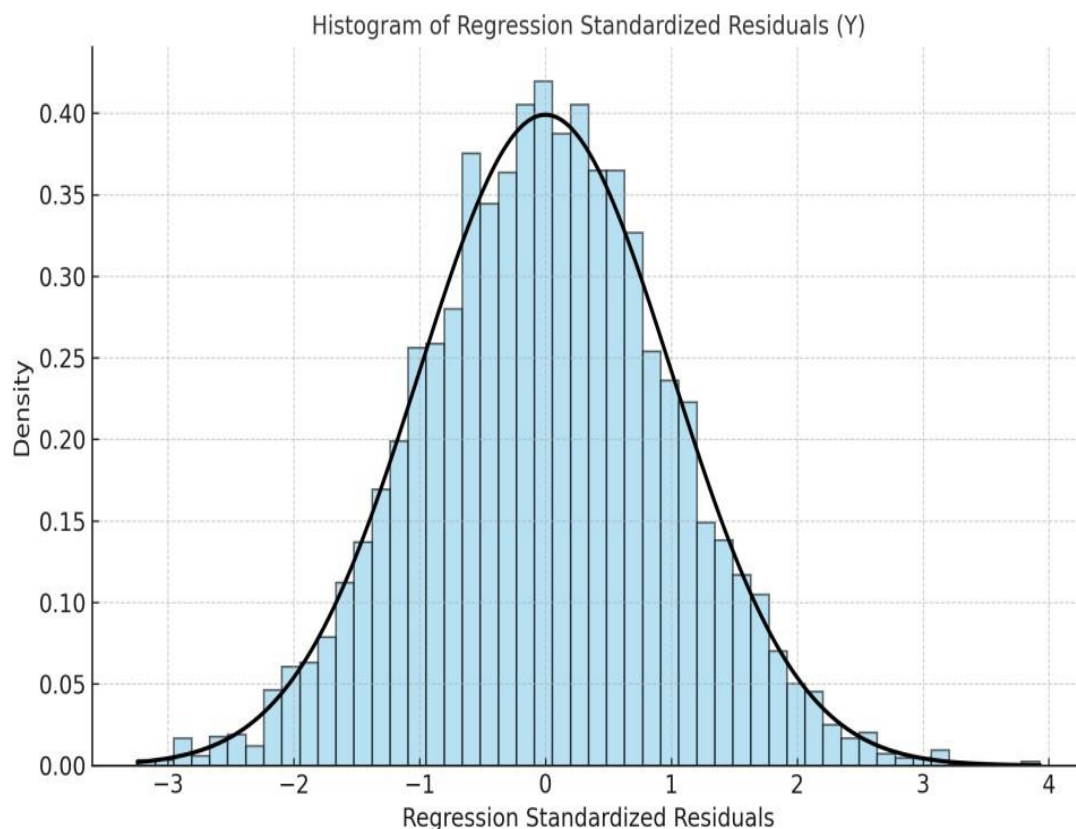


Figure 2. Histogram of Regression Standardized Residuals (Dependent Variable: Y)

4.5 Summary of Research Findings

The results strongly support all four hypotheses (H1–H4). Specifically, course assessment satisfaction (X1), student activity participation satisfaction (X2), and teaching management and service satisfaction (X3) all significantly contribute to the perceived enhancement of students' general and professional competencies (Y). Among these factors, student activities (X2) play the most dominant role, followed by course assessment (X1) and teaching services (X3). These findings underscore the multifaceted nature of competence enhancement, highlighting that classroom learning, extracurricular engagement, and institutional support work synergistically to improve students' overall capabilities.

5. Discussion and Implications

5.1 Research findings and Theoretical validation

The empirical results of this study provide robust evidence supporting the hypotheses (H1–H4) and offer new insights into how course assessment (X1), student activities (X2), and teaching services (X3) contribute to the enhancement of college students' general and professional competencies (Y).

First, course assessment satisfaction (X1) exhibits a significant positive effect on competence enhancement, validating H1. The standardized regression coefficient ($\beta = 0.334$) indicates that improvements in students' perceptions of assessment fairness, diversity, and formative feedback are strongly associated with perceived growth in general abilities, such as critical thinking and communication skills, as well as professional competencies. This aligns with Outcome-Based Education (OBE) principles, which emphasize that well-designed assessment systems not only measure learning outcomes but also drive learning behaviors and foster skill development (Biggs & Tang, 2011)²⁴. The results are also consistent with Liu et al. (2023), who found that diversified assessments such as project-based tasks and collaborative evaluations significantly improve students' ability to apply knowledge in practical contexts.

Second, student activities (X2) emerge as the strongest determinant of competence enhancement, confirming H2 and H4. With the highest standardized coefficient ($\beta = 0.451$), X2 demonstrates that extracurricular participation—ranging from cultural events and volunteer services to academic competitions—serves as a vital platform for cultivating leadership, teamwork, and interpersonal communication. This finding resonates with Astin's Student Engagement Theory (2017)¹⁴, which emphasizes that student involvement in non-academic activities is directly

linked to their holistic development. Similar results were observed by Hong and Park (2024)¹⁵, who highlighted that active engagement in campus activities strengthens problem-solving skills and boosts confidence. The prominent role of X2 also reflects the unique importance of the “second classroom” in Chinese higher education, where extracurricular experiences complement formal academic instruction and enhance students' employability.

Third, teaching services (X3) also significantly contribute to competence enhancement, supporting H3. Although its standardized coefficient ($\beta = 0.160$) is relatively minor, X3 remains statistically significant ($p < 0.01$), indicating that high-quality teaching management and responsive administrative services provide a supportive learning environment that reinforces students' motivation and satisfaction. This aligns with the **American Customer Satisfaction Index (ACSI)** model, which posits that service quality directly affects customer (or student) satisfaction and outcomes²¹. Prior research by Elliott and Shin (2020) similarly confirmed that efficient academic services, timely feedback, and accessible learning resources significantly enhance students' perceptions of institutional quality.

Fourth, the overall regression model explains 84.8% of the variance in Y, confirming the synergistic effects of X1, X2, and X3. This high explanatory power suggests that competence enhancement is **multifactorial** and that these three dimensions collectively shape students' learning experiences and outcomes. The findings also extend the applicability of **Expectation Disconfirmation Theory (EDT)** to educational contexts, demonstrating that students' satisfaction—and their perceived competence growth—are strongly influenced by whether institutional practices exceed their expectations in assessment, engagement, and service.

In summary, the results validate the integrated research model proposed in this study, supporting all four hypotheses. The evidence underscores that student activities are the most influential factor, followed by course assessment and teaching services. This finding is consistent with both international and domestic studies¹, highlighting the importance of fostering a balanced ecosystem that integrates classroom learning, extracurricular engagement, and administrative support to maximize students' overall competence development.

5.2 Comparison with Existing Studies

The findings of this study are broadly consistent with prior research on competence enhancement, while also providing new evidence that addresses gaps in the existing literature, particularly concerning private universities in China.

The positive effect of course assessment (X1) on competence enhancement aligns with global research on the role of diversified and formative evaluations. International studies have widely emphasized that formative assessment and continuous feedback are essential for improving students' critical thinking, application skills, and problem-solving abilities. For example, Croxton (2021)⁸ and Bahadur et al.¹⁰ (2024) found that students who experience transparent and constructive assessments are more motivated to engage in deep learning and self-reflection. Similarly, in the Chinese context, Zhuang and Liu (2022)¹¹ reported that universities implementing project-based assessments and peer evaluations observed a significant increase in students' practical competencies and teamwork skills. The results of this study echo these conclusions, highlighting that students at Harbin Cambridge University perceive a higher level of competence growth when they are evaluated through diverse, fair, and process-oriented methods.

However, this study also reveals that while assessment is essential, it is not the strongest predictor of competence enhancement. This finding contrasts with some prior research focused on public universities, where curriculum assessment often plays a dominant role due to the standardized teaching structures.

The significant and most substantial effect of student activities (X2) validates previous studies on the role of the "second classroom." Astin's (2017) student engagement theory asserts that students' involvement in extracurricular activities directly contributes to their personal and professional growth. The finding that X2 ($\beta = 0.451$) has the largest effect size aligns with Wu and Li (2020), who found that participation in campus cultural events, academic competitions, and volunteer services significantly improves students' leadership, communication, and problem-solving skills. International research further supports this, as Hong and Park (2024)¹⁵ demonstrated that extracurricular engagement correlates positively with students' career readiness and social adaptability.

Notably, this study's evidence suggests that private universities may rely more heavily on extracurricular programs to compensate for the limitations of classroom instruction. Unlike some public universities with standardized curricula and rigorous academic systems, private institutions often have greater flexibility to design student-centered activities that enhance real-world competencies.

The impact of teaching management and services (X3) is consistent with studies on service quality in higher education, but adds new insights into the private university context. Previous research (Elliott & Shin, 2020)¹⁷ has demonstrated that service quality—including academic advising, administrative efficiency, and digital learning platforms—is a critical driver of student satisfaction and academic success. This study corroborates such findings by showing that X3 ($\beta = 0.160$, $p < 0.01$) significantly contributes to competence enhancement. However, its relatively minor coefficient compared to X2 and X1 suggests that, although teaching services are essential, they act more as an enabling factor rather than a direct driver of competence growth. This observation aligns with Pan et al. (2022)¹⁹, who emphasized that administrative services provide the foundation for effective teaching and student engagement but may not directly build competencies unless integrated with experiential learning initiatives.

The overall explanatory power of the model ($R^2 = 0.848$) exceeds that reported in many earlier studies. While previous research often examined each factor separately, this study adopts an integrated three-dimensional model, demonstrating that course assessment, student activities, and teaching services work synergistically to shape competence enhancement. This integrated approach advances existing literature by showing that the relative influence of student activities is the highest, a finding that is underreported in prior studies focusing on public universities or single-factor analyses.

This study contributes a unique perspective by focusing on a private university in China. Most previous research on competence enhancement in China has concentrated on public universities or elite institutions (Li & Huang, 2023)⁵. The results of this study show that private universities, despite facing resource constraints, can still achieve high levels of student satisfaction and competence growth by leveraging innovative assessment systems, diverse extracurricular activities, and responsive teaching services. This reinforces the idea that institutional characteristics, such as flexibility and student-centered management, may allow private universities to adopt more customized and holistic approaches to student development.

5.3 Theoretical Implications

This study provides several theoretical contributions by integrating multiple conceptual frameworks—namely, the **American Customer Satisfaction Index (ACSI)**,

Expectation Disconfirmation Theory (EDT), Outcome-Based Education (OBE), and Astin's Student Engagement Theory—to explain how course assessment, student activities, and teaching services jointly influence students' competence enhancement.

The findings extend the application of ACSI in higher education. Traditionally, ACSI has been widely used in consumer behavior research to evaluate customer satisfaction and its impact on loyalty and perceived value (Fornell et al., 1996)²¹. By conceptualizing students as key stakeholders and “service recipients” in the educational process, this study demonstrates that students' satisfaction with academic assessment, extracurricular engagement, and institutional services can be analogized to customer satisfaction in service industries. The high explanatory power of the model ($R^2 = 0.848$) indicates that satisfaction is a robust predictor of competence enhancement. This supports the notion that educational quality can be effectively analyzed through a service-oriented lens, thus broadening the theoretical scope of ACSI.

The results provide empirical evidence for EDT by linking students' perceived expectations with competence growth. EDT posits that satisfaction is determined by the degree to which actual experiences exceed or fall short of prior expectations (Oliver, 1980)²². The findings of this study show that when students perceive course assessments to be diverse and transparent, student activities to be enriching and well-structured, and teaching services to be efficient and responsive, their sense of competence enhancement improves significantly. This confirms that the positive disconfirmation of expectations—where the actual educational experience is better than anticipated—can foster not only satisfaction but also perceived personal development. By applying EDT in the academic context, this study expands its relevance beyond consumer research and validates its utility in measuring student outcomes.

The study reinforces and enriches OBE principles. OBE emphasizes that teaching and assessment should focus on observable outcomes and students' ability to apply knowledge in real-life scenarios (Spady, 1994). The finding that course assessment (X1) significantly affects competence enhancement highlights the importance of the evaluation as both a measurement and a learning tool. The positive association between process-oriented assessment and students' self-perceived skill development aligns with the OBE principle that “assessment drives learning” (Biggs & Tang, 2011)²⁴.

Moreover, the strong influence of student activities (X2) suggests that OBE frameworks should incorporate non-academic learning experiences as critical components of outcome measurement.

The study adds new insights to Astin's Student Engagement Theory. Astin (2017) argues that student learning and development are functions of the quality and quantity of student involvement. The results, particularly the dominant role of X2 ($\beta = 0.451$), provide empirical support for this theory by showing that extracurricular engagement significantly contributes to competence enhancement. This suggests that engagement is not only about academic participation but also encompasses leadership, teamwork, and real-world problem-solving cultivated in co-curricular settings. This finding deepens the theoretical understanding of how engagement translates into measurable competence growth.

The integrated model proposed in this study offers a multi-dimensional theoretical framework for future research. By examining the combined effects of X1, X2, and X3, this study addresses a critical gap in existing research that often focuses on single factors. The model demonstrates that competence enhancement is a multifactorial construct, influenced by both academic (e.g., assessment) and non-academic (e.g., student services and activities) elements. This holistic perspective encourages scholars to adopt interdisciplinary theoretical approaches that bridge educational psychology, service management, and organizational behavior in the analysis of student development.

5.4 Practical Implications

The findings of this study have practical value for improving educational quality in private universities. The significant influence of course assessment (X1), student activities (X2), and teaching services (X3) on competence enhancement (Y) suggests **that** a multi-dimensional strategy is required to foster students' general and professional abilities. Based on these results, the following implications are proposed. **Reform and Diversify Course Assessment.** The results highlight the positive impact of X1 ($\beta = 0.334$), confirming that well-designed and diverse assessment systems can enhance students' learning motivation and self-perceived competence growth. Adopt a process-oriented assessment approach. Private universities should shift from a reliance on high-stakes final exams to formative assessments, including project-based assignments, portfolios, and peer evaluations. Such practices not only measure knowledge but also promote problem-solving, critical thinking, and collaborative skills (Biggs & Tang, 2011)²⁴.

Ensure transparency and fairness. Students are more likely to engage deeply when they believe that assessments are fair and align with learning objectives. Regular feedback sessions and clear rubrics can improve the perceived fairness and effectiveness of evaluations. **Integrate real-world tasks.** Assessments that simulate workplace challenges, such as case analyses or interdisciplinary projects, can strengthen students' practical and professional competencies, making them better prepared for future careers. **Strengthen the "Second Classroom" and Student Engagement.** With X2 having the most substantial effect ($\beta = 0.451$), the findings underscore the **central** role of extracurricular activities in holistic student development. **Enrich the diversity of student activities.** Universities should design a broad spectrum of co-curricular programs, ranging from cultural festivals and entrepreneurship competitions to community service initiatives. These activities help students cultivate leadership, teamwork, and organizational skills. **Create structured engagement platforms.** Student clubs, academic societies, and volunteering groups should be well-supported with faculty mentorship, funding, and resource-sharing platforms. This ensures that students are not only participating but also gaining valuable experiential learning outcomes. Recognize and reward participation. Formal recognition, such as awarding credits or certificates for active participation in extracurricular activities, can incentivize students to take part in meaningful non-academic experiences that complement classroom learning. **Leverage digital platforms.** Online communities and virtual collaboration tools can be used to expand participation, especially for students with limited on-campus opportunities. **Improve Teaching Management and Service Quality.** Although X3 ($\beta = 0.160$) has a relatively minor effect, it remains a crucial foundation for creating a supportive learning ecosystem. **Enhance digital learning environments.** Universities should invest in online learning platforms, intelligent feedback systems, and digital **libraries** to provide students with easy access to resources and timely academic support. **Streamline administrative services.** Efficient administrative procedures, such as quick responses to student inquiries, transparent grading systems, and user-friendly registration processes, can improve students' satisfaction and reduce unnecessary frustration.

Strengthen academic advising. Personalized mentoring and career guidance services can help students plan their academic paths, identify their strengths, and connect curricular learning with professional aspirations. **Build a feedback-driven service culture.** Establishing feedback channels, such as online

surveys and focus groups, allows universities to evaluate and and focus groups, allows universities to evaluate and refine their teaching and service quality continuously.

Foster a Holistic Educational Ecosystem. The combined R^2 value of 0.848 demonstrates that competence enhancement is not driven by a single factor but by the interplay of multiple dimensions. Therefore, universities should: Integrate curriculum reform, extracurricular engagement, and service improvement into a cohesive strategy; Encourage collaboration between academic departments and student affairs offices to design cross-functional initiatives that address both academic and personal development needs; Monitor competence enhancement as a long-term indicator of educational quality, using student surveys and performance tracking to inform policy and practice.

Policy Implications for Private Universities. Given the unique challenges of private universities in China—such as limited funding, lower social recognition, and diverse student cohorts—this study highlights the need for: **Targeted investment in co-curricular programs** that provide high-impact, low-cost opportunities for student engagement; **Flexible curriculum design** that incorporates industry collaboration, internships, and experiential learning to strengthen the linkage between classroom instruction and career readiness; **A student-centered service model**, aligning with international best practices that treat students as active participants and co-creators of their educational journey.

5.5 Research Limitations and Future Prospects Although this study provides valuable insights into the factors influencing students' competence enhancement, several limitations should be acknowledged, which in turn offer opportunities for future research.

The study is based on a single private university, which may limit the generalizability of the findings. While Harbin Cambridge University is representative of private higher education institutions in Northeast China, the results may not fully capture the diversity of student experiences across different regions or institutional types. Future studies should consider conducting multi-institutional surveys, including both public and private universities, to validate the robustness of the three-dimensional model across broader contexts.

The study relies on self-reported data, which are inherently subjective and may be affected by response bias. Students' perceptions of course assessment, extracurricular engagement, and teaching services may not fully reflect the actual quality or outcomes of these practices. To address this, future research could combine subjective surveys with objective performance indicators, such as academic grades, competency-based evaluations,

or employer feedback, to provide a more comprehensive assessment of competence enhancement.

The research design is cross-sectional, limiting the ability to infer causal relationships or track changes over time. Although the regression analysis provides evidence of associations among variables, it cannot fully establish cause-and-effect dynamics. Longitudinal studies or experimental designs could be implemented to observe how course assessment reforms, new extracurricular initiatives, or service improvements impact students' competencies over multiple semesters or academic years.

The measurement framework could be further refined. While the constructs (X1, X2, X3, Y) demonstrated high reliability and validity, the number of items for each dimension was limited to ensure clarity and brevity. Future studies could develop more comprehensive and multidimensional scales that capture additional aspects, such as students' emotional engagement, self-directed learning behaviors, or resilience, which are increasingly recognized as critical components of competence enhancement.

The model does not account for potential moderating or mediating factors. Variables such as gender, socioeconomic background, prior academic performance, or motivation might moderate the relationships between X1, X2, X3, and Y. Future research could incorporate structural equation modeling (SEM) to examine mediating mechanisms (e.g., student satisfaction as a mediator) or moderating effects, providing a more nuanced understanding of the competence enhancement process.

The study focuses on the Chinese private university context, which may differ from international practices. Comparative studies involving universities in other countries or regions would enrich the understanding of how cultural, institutional, and policy differences influence the interplay between course assessment, student activities, teaching services, and competence development.

6. CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

This study explored the influence of **course assessment (X1), student activities (X2), and teaching services (X3)** on the perceived enhancement of **general and professional competencies (Y)** among students at a Chinese private university.

Grounded in **American Customer Satisfaction Index (ACSI)** and **Expectation Disconfirmation Theory (EDT)**, the study developed a three-dimensional research model and empirically tested four hypotheses (H1–H4) using data collected from 5,853 valid questionnaires.

All three institutional factors significantly and positively affect competence enhancement.

Course assessment (X1), student activities (X2), and teaching services (X3) jointly explain 84.8% of the variance in students' perceived competence growth. This highlights the need for a holistic approach that integrates academic evaluation, extracurricular engagement, and service support.

Student activities exert the most decisive influence ($\beta = 0.451$). The prominent role of the “second classroom” underscores that extracurricular participation complements classroom instruction and plays a crucial role in fostering leadership, teamwork, and communication skills.

Course assessment has a substantial impact ($\beta = 0.334$), confirming the importance of process-oriented and diverse evaluation systems. Students respond positively to transparent, fair, and formative assessments that encourage critical thinking, creativity, and knowledge application.

Teaching services also contribute to competence enhancement ($\beta = 0.160$), though as a supportive rather than primary driver. Effective academic advising, administrative efficiency, and timely feedback form the foundation for positive learning experiences and personal growth.

Overall, these findings validate the integrated model and confirm all four hypotheses (H1–H4). They also reinforce the applicability of ACSI and EDT in educational contexts, demonstrating that student satisfaction acts as a key driver of competence enhancement.

6.2 Theoretical Contributions

This research makes several theoretical contributions. **Extending ACSI and EDT:** By conceptualizing students as active stakeholders, the study extends customer satisfaction frameworks to analyze educational quality and outcomes. **Enriching OBE and student engagement theory:** The findings highlight how course assessment and extracurricular activities align with the OBE principle of “assessment driving learning,” while also confirming Astin's assertion that student

engagement—especially outside the classroom—significantly influences personal and professional development. **Proposing a comprehensive model:**

Unlike previous studies focusing on single factors, this research offers an integrated perspective, illustrating how academic and non-academic dimensions collectively shape competence enhancement.

6.3 Practical Recommendations

Based on the findings, the following recommendations are proposed for private universities:

Reform course assessment systems. Adopt a diverse and process-oriented evaluation framework that balances formative and summative assessments. Integrate project-based tasks, group presentations, and real-world problem-solving exercises into coursework to cultivate practical skills. Ensure fairness and transparency by using detailed rubrics, clear criteria, and frequent feedback.

Enhance student activities and the “second classroom.” Expand the variety of extracurricular programs, including innovation and entrepreneurship competitions, cultural events, and volunteering initiatives. Provide institutional support, such as faculty mentorship, funding, and formal recognition, to encourage deeper engagement. Integrate extracurricular achievements into students’ comprehensive evaluations and credit systems.

Improve teaching services. Develop user-friendly digital platforms for academic consultation, resource access, and feedback. Strengthen career counseling, academic advising, and mental health services to support students’ holistic development. Establish feedback loops—such as periodic student satisfaction surveys—to continuously monitor and enhance service quality.

Promote an integrated development ecosystem. Create collaboration mechanisms between academic departments, student affairs, and administrative units to ensure that curriculum, extracurricular activities, and services are mutually reinforcing. Track students’ competence growth through longitudinal assessments and incorporate findings into institutional quality improvement initiatives.

6.4 Future Research Directions

Future research should build on this study by: Conducting multi-institutional or cross-regional studies to test the generalizability of the model across

diverse educational contexts and employing longitudinal research designs to capture the dynamic effects of course assessment reforms and co-curricular programs on competence growth and investigating moderating and mediating factors, such as gender, academic discipline, or student motivation, to deepen understanding of the mechanisms driving competence enhancement. Integrating objective performance indicators (e.g., academic grades, internship evaluations) with self-reported data to enhance measurement validity and extending the research to an international comparative perspective, exploring how cultural and policy differences shape the relationship between institutional practices and student outcomes.

This study provides empirical evidence and actionable insights into how course assessment, student activities, and teaching services contribute to students’ competence enhancement. By bridging theoretical frameworks with practical recommendations, it offers a roadmap for private universities seeking to optimize their educational quality and better prepare graduates for the challenges of a rapidly evolving global workforce.

DECLARATIONS

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no conflict of interest.

Funding

This research received no external funding.

1. Kuh, G. D. (2020). Student engagement in the first year of college: Implications for practice. *Change: The Mag. of Who Learning*, 52 (2), 8-17. <https://doi.org/10.1080/00091383.2020.1574672>.
2. Kinzie, J., & Kuh, G. D. (2019). Reframing student success: Learning and personal development over time. *Change: The Magazine of Who Learning*, 51 (1), 18 to 27. <https://doi.org/10.1080/00091383.2019.1570971>.
3. Tight, M. (2022). A focus on assessing students' holistic development in China: Challenges in policy implementation. *Policy Futures in Education*, 20(8), 972- 987.
4. Zhang, W., & Tight, M. (2021). Student success in higher education: A review and synthesis of the literature. *Studies in Higher Education* 46(4),685-701.<https://doi.org/10.1080/03075079.2019.1672647>
5. Li, S., Huang, X., Lin, L., & Chen, F. (2023). Immediate versus delayed feedback in online testing: Impact on student academic performance. *Asia Pacific Education Review*, 24(1), 89-105.
6. Wu, J., Xu, Y., & Zhang, L. (2021). Online learning satisfaction in higher education during the COVID-19 pandemic: -Evidence from China. *Education and Information Technologies*, 26(6), 7321-7345. <https://doi.org/10.1007/s10639-021-10519-x>.
7. Liu, Y., Chen, Z., & Wang, H. (2023). Assessment reform and its effect on student competencies in Chinese universities. *Higher Education Research & Development*, 42 (5), 987-1003. <https://doi.org/10.1080/07294360.2023.2198704>.
8. Croxton, R. A. (2021). Investigating student satisfaction with online collaborative learning: Effects of cognitive load and expectation confirmation. *Distance Education*, 42(1), 34.
9. Chen, F., Li, S., Lin, L., & Huang, X. (2024). Identifying temporal changes in student engagement in social annotation during online collaborative reading. *Education and Information Technologies*, 29, 16101-16124. <https://doi.org/10.1007/s10639-024-12494-5>.
10. Bahadur, S., Gurung, S. K., Poudel, R. L., Yadav, U. S., Bhattacharjee, A., & Dhungana, B. R. (2024). The effect of higher education service quality on satisfaction among business students in India and Nepal. *Cogent Education*, 11 (1), 2393521.<https://doi.org/10.1080/2331186X.2024.2393521>.
11. Zhuang, T., & Liu, B. (2022). Sustaining higher education quality through service quality and student motivation: An empirical study at a Chinese university. *Journal of Education and Practice*, 13(4), 45-58.<https://doi.org/10.7176/JEP/13-4-05>.
12. Elliott, K. M., & Healy, M. A). Key Factors Influencing Student Satisfaction Related to Recruitment and Retention. *Journal of Marketing for Higher Education*, . 2001 10(4);1–11.
13. Syed, M. A., & Akram, U. Role of co-curricular activities in behavior formation and academic performance: A survey in Pakistan. *International Journal of Educational Technology in Higher Education*,2023;20(1).22.
14. Alexander W. Astin Student Involvement: A Development Theory for Higher Education1984Journal of College Student Development 40:518-529
15. Hong, S., & Park, J. (2024). Impact of online learning on student engagement and performance: A systematic review. *Higher Education Research & Development*,43(3),500-516.
16. Syed, M. A., & Hussain, F. (2023). Behavior formation through co-curricular activities in secondary school students. *International Journal of Educational Development*,95,102447. <https://doi.org/10.1016/j.ijedudev.2023.102447>.
17. Elliot, K.M. and Shin, D. Student Satisfaction: An Alternative Approach to Assessing This Important Concept. *Journal of Higher Education Policy and Management*.2002; 24; 197-209. <https://doi.org/10.1080/1360080022000013518>
18. Ribeiro, J. A., & Pereira, L. (2021). The role of student satisfaction and service quality on students' loyalty in Portuguese higher education. -- -- Further and who Education,45(5),681-696. <https://doi.org/10.1080/0309877>.
19. Pan, F., Liu, L., & Wang, Z. (2022). The Chinese university stakeholder satisfaction survey: Developing a customer-centered self-assessment tool for higher education quality management—*Frontiers in Psychology*, 13,1043417. <https://doi.org/10.3389/fpsyg.2022.1043417>.
20. Chen, Q., Chen, N., & Yang, Y. (2023). The impact of college students' perceived service quality in the context of regional integration of Education. *The SAGE Open*,13(3),21582440231197505. <https://doi.org/10.1177/21582440231197505>.
21. Fornell, C., Johnson, M. D., Anderson, E. W., Cha, J., & Bryant, B. E. (1996). The American Customer Satisfaction Index: Nature, the purpose, and findings. *Journal of Marketing*, 60 (4), 7-18.
22. Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, 17 (4), 460-469. <https://doi.org/10.2307/3150499>.
23. A Parsu Parasuraman, Valarie A. Zeithaml, Leonard L Berry SERVQUAL A Multiple-item Scale for Measuring Consumer Perceptions of Service Quality1988;Journal of Retailing 64(1):12-40
24. Biggs, John, Tang Teaching For Quality Learning At University Edition, illustrated ; Publisher, McGraw-Hill Education (UK), 2011 ; ISBN, 0335242758, 9780335242757 ; Length, 389