

The Impact Of Student Affairs Supports On Students' Comprehensive Qualities: The Mediating Role Of Student Engagement

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Abstract

Grounded in Astin's Input–Environment–Outcome model, this study examines how Student Affairs Supports (SAS) influence Students' Comprehensive Qualities (SCQ) through the mediating mechanism of Student Engagement (SE). Survey data were gathered from 482 undergraduates across public and private universities in Zhengzhou, China, using a stratified random sampling strategy. Empirical testing was executed via IBM SPSS and AMOS using Covariance-Based Structural Equation Modeling (CB-SEM).

Structural path analytics confirmed that all proposed baseline hypotheses were supported. Student Affairs Supports exerted significant direct positive effects on both Student Engagement and Students' Comprehensive Qualities, while Student Engagement emerged as the primary direct predictor of comprehensive qualities. Bias-corrected percentile bootstrapping further verified that Student Engagement functions as a complementary partial mediator, accounting for 61.41% of the total institutional impact on holistic student development. These findings demonstrate that while university support systems directly foster student capabilities, their primary efficacy lies in triggering active student involvement. University administrators should accordingly pivot from passive resource provision toward engagement-centric administrative designs.

Keyword: Student Affairs Supports; Student Engagement; Comprehensive Qualities; I-E-O Model; Structural Equation Modeling.

1. Introduction

The digital intelligence revolution and the global transition toward mass higher education have fundamentally restructured university governance, operational paradigms, and student development frameworks. In contemporary higher education, student affairs support systems serve as an essential institutional pillar connecting administrative operations with student growth. Historically oriented toward basic compliance, routine supervision, and administrative oversight, university student affairs now faces urgent imperatives to transition toward data-driven, student-centered, and developmental empowerment models. As higher education systems expand rapidly, evaluating whether and how institutional investments in student affairs support translate into holistic student competencies has emerged as a central research priority for educational policy and university management.

Technology continuously reshapes both the external environment and internal relational dynamics of higher education. The evolution from basic campus electronification to data-driven intelligence has established a new ecosystem for educational supply, leveraging human-AI collaboration to enable large-scale individualized instruction and system-wide innovation (Zhong, 2023). Under national strategic initiatives such as the Outline of the National Education Development Plan (2024–2035), China has positioned educational digitalization as a core

mechanism for structural modernization (State Council of the PRC, 2024). Generative AI and intelligent platforms are rapidly integrating into academic, research, and administrative domains; empirical surveys show that 90.7% of Chinese universities have implemented information-based faculty training and 68.7% have adopted AI applications to varying degrees. Concurrently, China's higher education system has reached deep popularization, with total university enrollments exceeding 42 million students in 2024 and annual graduates projecting to reach 12.22 million in 2025. Against this macroeconomic backdrop of soaring student populations, diverse individual needs, and intense labor market competition, student affairs systems face severe governance pressures (Cao & Siththada, 2024). These challenges are particularly acute in regional higher education hubs like Zhengzhou, the core central city of the Central Plains urban agglomeration, where universities are tasked with cultivating high-quality human capital for rapidly upgrading regional industries (Ou et al., 2025).

Understanding current governance bottlenecks requires examining the conceptual evolution of student affairs support. In global higher education traditions, student affairs operates as a professionalized non-academic support system that works alongside formal classroom instruction to foster retention, campus integration, and long-term life competencies (Kuh, 2008). In Chinese higher education, however, student affairs carries a complex dual responsibility rooted in localized socio-political contexts, fusing Western developmental models with ideological guidance, financial aid, career guidance, and crisis intervention (Zhang, 2024; Zheng, 2024). Student affairs personnel must balance conflicting roles as both enforcers of administrative order and empathetic mentors for personal growth. However, when practices become bogged down in reactive firefighting and administrative compliance, support systems become superficial and fail to promote meaningful long-term development (Cao & Siththada, 2024). To overcome these limitations, this study conceptualizes student affairs support into two practical dimensions: efficiency-driven Digital Intelligence Service Support and effectiveness-driven Development Empowerment Support.

Existing research on Chinese higher education digital intelligence platforms and student affairs support systems relies heavily on descriptive policy analysis and qualitative case studies centered on elite universities, creating a severe empirical blind spot regarding regional, non-elite institutions such as those in Zhengzhou (Cao & Siththada, 2024). Crucially, key theoretical and practical gaps remain unaddressed: positive psychology, vocational psychology, and educational sociology have historically evaluated psychological capital, career adaptability, and civic literacy in isolation rather than as an integrated ecosystem of outcomes; student engagement literature continues to prioritize classroom instruction over non-academic administrative supports as empirical antecedents (Zhong, 2023); and grade level is routinely treated as a simple demographic control rather than a formal lifecycle moderator. Practically, Chinese higher education suffers from a "heavy investment, light evaluation" dilemma, where administrative efficiency and digital coverage are easily quantified, but long-term developmental causal chains remain obscure (Petrychenko et al., 2023; Waryold & Lancaster, 2023). Failure to resolve these gaps risks reducing digital transformation to passive electronic compliance (Schuh et al., 2016) and leaving student services without tailored, stage-specific strategies across academic cohorts. By synthesizing Astin's (1993) Inputs-Environments-Outputs (I-E-O) model with Savickas's (2012) Career Construction Theory, this study empirically investigates the direct and indirect impacts of Digital Intelligence Service Support and Development Empowerment Support on students' Comprehensive Qualities in Zhengzhou, examining the mediating mechanism of Student Engagement and the moderating role of Grade Level to offer evidence-based insights for higher education governance.

2. Theoretical foundation

Overarching Structural Framework: Astin's I-E-O Model

To evaluate how higher education support systems cultivate student development, this study establishes an integrated theoretical framework rooted in Astin's Inputs-Environments-Outcomes (I-E-O) model (Astin, 1993). As the macro-level structural anchor, the I-E-O model posits that student development is not merely a function of baseline characteristics at entry (Inputs), but is primarily shaped through sustained interaction with institutional environments (Environments), which ultimately determines developmental results (Outcomes) (Pascarella & Terenzini, 2005). Within this structural logic, Student Affairs Supports, operationalized through Digital Intelligence Service Support and Development Empowerment Support, constitutes the critical environmental mechanism (E). Students' background characteristics and developmental stages serve as input controls (I), while Students' Comprehensive Qualities represents the primary outcome (O). By shifting the analytical focus from fixed individual attributes to institutional experiences, the I-E-O model provides the foundation for mapping direct and indirect educational impacts (Kuh, 2008).

Process-Oriented Mechanism: Student Engagement Theory

To explain the internal process through which institutional environments translate into personal growth, this study incorporates Student Engagement Theory as the core mediating mechanism (Kuh, 2008). Drawing on the multidimensional formulation by Fredricks et al. (2004), student engagement is conceptualized across three distinct, non-hierarchical dimensions: behavioral, emotional, and cognitive investment. In contemporary digitized campus settings, distinguishing these dimensions prevents empirical obfuscation; digital tools may enforce structural compliance and system utilization (behavioral engagement) without necessarily fostering institutional belonging (emotional engagement) or deep learning strategies (cognitive engagement) (Appleton et al., 2006). Student Engagement Theory asserts that institutional provisions do not automatically enhance student capability; rather, effective support infrastructures serve as external antecedents that stimulate active student participation, which subsequently drives internal skill acquisition and psychological growth.

Foundations for the Dependent Variable: Integrated Outcome Perspective

Finally, to establish domain-specific legitimacy for the multidimensional dependent variable, this study integrates three complementary outcome theories. The psychological dimension is grounded in Psychological Capital Theory, which conceptualizes internal resources through the HERO model, which include hope, efficacy, resilience, and optimism (Luthans & Broad, 2025). Crucially, psychological capital is defined as a malleable, "state-like" capacity rather than a fixed trait, making it an alterable educational outcome responsive to environmental empowerment (Youssef-Morgan, 2024). The vocational dimension draws on Career Construction Theory, which views career development as a self-regulatory process centered on career adaptability (Savickas, 2013). By focusing on the 4C resources, concern, control, curiosity, and confidence, the theory explains how supportive campus environments enhance students' capacity to navigate labor market volatility. Complementing these individualistic perspectives, the social and ethical dimension relies on Civic Engagement Theory alongside democratic education principles (Astin, 1996). This lens frames the university as a civic microcosm where institutional culture, administrative interactions, and collaborative opportunities directly cultivate social responsibility, public awareness, and prosocial behavior.

3. Literature Review

Student Affairs Supports on Students' Comprehensive Qualities

Under the Input–Environment–Outcome framework, university support services function as a dynamic environmental catalyst that directly shapes holistic student development rather than acting as a passive administrative background. Development empowerment support, delivered through structured mentorship, personalized counseling, and high-impact community initiatives, serves as a primary mechanism for cultivating students' psychological and social competencies. Empirical evidence indicates that empathetic counselor interactions and relational support systems replenish students' internal reserves of hope, resilience, and optimism, effectively buffering academic anxiety and safeguarding emotional well-being (Jia et al., 2024). Beyond psychological stabilization, proactive empowerment models and inclusive campus networks systematically foster long-term career adaptability and civic responsibility. When institutions offer targeted personal growth frameworks and community integration initiatives, they significantly elevate student self-efficacy, reduce socio-structural equity gaps, and accelerate the internalization of prosocial values (Bratko & Khoruzha, 2025).

Concurrently, the rapid evolution of digital intelligence service support optimizes student resource allocation by eliminating administrative friction and expanding developmental accessibility. Integrated digital platforms, AI-driven career diagnostic systems, and continuous online mental health portals lower the psychological and procedural barriers to institutional help-seeking, fostering a stronger sense of institutional trust and task-oriented confidence (Bingham, 2023). Recent field metrics demonstrate that well-coordinated, technology-mediated student affairs operations directly accelerate emotional well-being and academic achievement by streamlining transactional compliance (Alcopra et al., 2025). By automating bureaucratic tasks and providing precise, real-time guidance, smart support infrastructures conserve students' cognitive and temporal energy, thereby liberating their capacity for deep educational engagement, vocational exploration, and active civic participation.

The Impact of Student Affairs Supports on Student Engagement

As a pivotal process variable in higher education development, student engagement relies not only on intrinsic learning motivation but is fundamentally activated by the institutional support environment. Modern digital intelligence service support acts as a structural engine for optimizing student participation by lowering friction and providing dynamic, personalized interactions. Advanced campus ecosystems equipped with predictive analytics, AI-assisted learning platforms, and real-time behavioral decoding tools allow administrations to transition from reactive troubleshooting to proactive intervention, thereby sustaining intense levels of behavioral and cognitive immersion (Chen et al., 2025). Empirical studies demonstrate that when smart analytics adapt to individual learning paces and deliver instant, customized feedback, they significantly reduce the psychological friction of academic tasks and spark deep cognitive investment (Parveen et al., 2025). However, researchers caution that digital convenience alone does not linearly guarantee engagement; technological systems must be intentionally paired with humanized interactive spaces to prevent technological alienation and ensure that structural usage translates into authentic emotional belonging (Uzorka & Odebiyi, 2025).

Complementing technological infrastructure, development empowerment support provides the necessary psychological incentives for sustaining student energy across behavioral, emotional, and cognitive dimensions. Grounded in basic psychological needs theory, supportive relational environments created by university mentors and counselors fulfill students' fundamental needs for relatedness and institutional belonging, shifting their internal motivational state toward deep academic investment (Prananto et al., 2025). Empirical modeling reveals that institutional emotional support operates through a sequential psychological mediation chain: developmental care and empathetic mentorship act as environmental catalysts that first ignite academic self-efficacy and fortify psychological resilience (Guo et al., 2025). Once activated, these internal psychological engines shield students from academic frustration, driving them to dedicate greater physical, affective, and

cognitive energy to their educational journey.

The Impact of Student Engagement on Students' Comprehensive Qualities

As a pivotal process construct in higher education development, student engagement serves as the primary internal engine that converts external institutional resources into long-term individual competencies. In the domain of psychological growth, sustained behavioral and emotional investment provides the positive experiential base required to build malleable psychological capital. Deep academic and campus involvement establishes a protective buffer against academic burnout, continuously replenishing internal reserves of self-efficacy, hope, resilience, and optimism (Nabais et al., 2024). Within competitive and rapidly evolving educational contexts, this positive psychological capital acts as a core motivational catalyst that locks students into high-level cognitive and behavioral immersion (Fan et al., 2026). Concurrently, multidimensional engagement functions as a dynamic developmental escalator for vocational readiness. Longitudinal tracking confirms that early classroom and co-curricular immersion directly expands students' future coping mechanisms, unlocking the key dimensions of career adaptability, concern, control, curiosity, and confidence (Su et al., 2025). Rather than institutional career programming directly dictating job readiness, active learning engagement serves as the irreplaceable bridge through which formal vocational inputs are transformed into adaptable, real-world competencies.

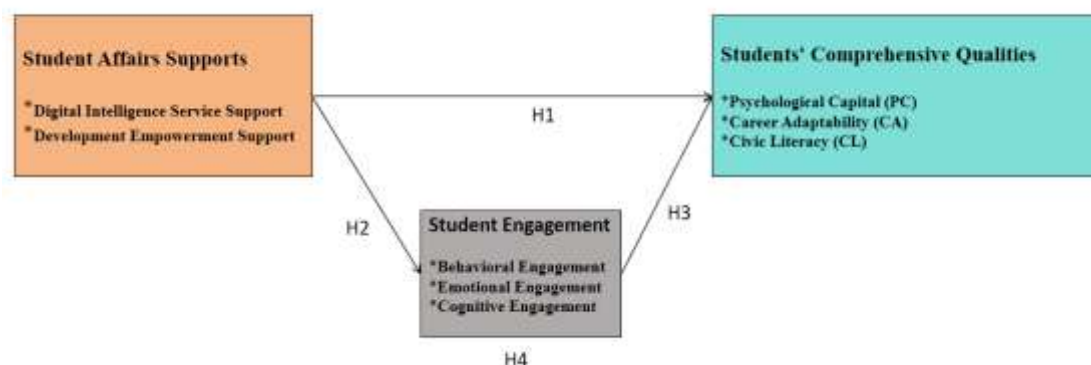
Beyond individual psychological and vocational gains, student engagement performs a crucial internalizing function in the cultivation of civic literacy. Educational content and institutional values remain largely dormant until they trigger active behavioral, emotional, and cognitive participation from students. When learners actively immerse themselves in societal discussions, collaborative projects, and institutional civic spaces, this multi-dimensional engagement acts as a psychic conduit that translates abstract institutional lessons into lasting civic habits and political awareness (Jebarus & Sunarso, 2026; Pacatan et al., 2025). By providing the experiential laboratory where external knowledge is critically evaluated and emotionally digested, sustained student investment ensures that social responsibility and prosocial ethics are internalized as core components of a student's holistic identity.

Mediating Mechanisms of Student Engagement

Grounded in Astin's Input–Environment–Outcome (I-E-O) model, institutional support structures do not automatically generate student development; rather, external environmental inputs rely fundamentally on student involvement to produce sustainable outcomes. Within this process-oriented paradigm, multi-dimensional student engagement operates as the primary mediating pipeline through which institutional supports are translated into comprehensive student qualities. Emotionally, supportive relational environments foster school identification and psychological safety, providing the affective conduit through which external support expands cognitive resources and builds internal psychological capital (Oriol-Granado et al., 2024; Xiong et al., 2025). Behaviorally, active participation in practical and career-oriented initiatives serves as the concrete action mechanism that transforms institutional resources into transferable vocational competencies and self-efficacy (Chaudhry et al., 2024). Cognitively, deep processing and structured reflection are essential for internalizing higher-order civic literacy, ensuring that surface-level compliance is elevated into stable ethical values and social responsibility (Guanlao et al., 2025). Recent empirical research confirms that external administrative frameworks fail to directly yield long-term developmental gains unless they operate through the primary mediating vector of student engagement (Prananto et al., 2025). By proving that structural interventions dictate the uneven development of student competencies based on the specific engagement pathways they activate, these findings confirm that student engagement is the definitive psychological and behavioral crucible where institutional support is successfully transformed into holistic student outcomes (Yan et al., 2026).

According to the Theoretical foundation and Literature Review, the following Conceptual Framework and hypothesis are proposed;

Conceptual Framework



H1: Student Affairs Supports have a significant positive direct impact on Students Comprehensive Qualities.

H2: Student Affairs Supports have a significant positive direct impact on Student Engagement.

H3: Student Engagement has a significant positive direct impact on Students Comprehensive Qualities.

H4: Student Engagement significantly mediates the relationship between Student Affairs Supports and Students Comprehensive Qualities.

4. Methodology

Grounded in Astin's Input–Environment–Outcome (I-E-O) model and Kuh's theory of student engagement, this study adopts a positivist research paradigm and a deductive quantitative design to examine how university student affairs supports (environmental inputs) shape comprehensive student qualities (outcomes) through the process pathways of student engagement. To ensure the rigor of causal inference and safeguard against common method variance (CMV) inherent in self-reported data, strict procedural controls and post hoc statistical diagnostics were implemented. Chronologically, the structural design strictly adheres to the established higher education framework: objective institutional support systems (Environment) logically precede individual student behavioral, emotional, and cognitive involvement (Process/Engagement), which subsequently dictates the long-term cultivation of personal competencies (Outcome).

Data collection was executed using a six-stage stratified random sampling strategy targeting full-time undergraduate students across Zhengzhou, Henan Province, a national higher education hub in central China. To secure structural representativeness, the sampling matrix was stratified by institutional tier and lifecycle grade level. Four representative target institutions were selected: Zhengzhou University (accounting for 35.0% of the sample frame), Henan University of Technology and Zhengzhou University of Light Industry (totaling 35.0%), and Huanghe Science and Technology University (30.0%). Class registration rosters obtained in collaboration with institutional academic offices served as primary sampling units, ensuring equal selection probability. Dictated by the parameter requirements of covariance-based structural equation modeling (CB-SEM) and multi-group moderation evaluations, 600 standardized questionnaires were systematically distributed.

To empirically test the structural model and its indirect pathways, a two-step quantitative analytical pipeline was deployed using IBM SPSS (Version 26.0) and Analysis of Moment Structures (IBM SPSS AMOS, Version 26.0).

5 Result

Demographic Characteristics

Following data cleaning to remove incomplete submissions, multivariate outliers, and unengaged responses, a final sample of 482 valid cases ($N = 482$) was retained. As detailed in Table 1, the sample exhibits a balanced and representative demographic structure. Gender distribution is remarkably even, with male participants accounting for 51.7% ($n = 249$) and female participants making up 48.3% ($n = 233$), providing a neutral baseline that minimizes gender-related distortion. The age distribution mirrors standard undergraduate lifecycles in China, anchored primarily by the 21–23 (42.9%, $n = 207$) and 24–26 (28.6%, $n = 138$) age brackets, alongside smaller cohorts aged 18–20 (15.1%, $n = 73$) and 26 or older (13.3%, $n = 64$). Across academic levels, the sample spans all four undergraduate stages, Freshmen (22.0%), Sophomores (32.0%), Juniors (27.2%), and Seniors (18.9%), establishing a solid foundation for evaluating developmental shifts and testing grade-level moderating effects. Participants also reflect diverse disciplinary backgrounds, centered on main tracks including Engineering (23.7%), Economics and Management (23.0%), Natural Sciences (21.6%), and Humanities and Social Sciences (18.5%).

Regarding institutional and socioeconomic backgrounds, the sample closely aligns with the structural landscape of Zhengzhou as a major higher education hub in Central China. Private college students comprise 69.3% ($n = 334$) of respondents compared to 30.7% ($n = 148$) from public institutions, capturing the prominent footprint and applied focus of private higher education providers in the region. This distribution offers a realistic context for evaluating how student affairs supports operate across varying institutional resource capacities. Furthermore, 64.9% ($n = 313$) of respondents hail from rural areas while 35.1% ($n = 169$) come from urban settings, echoing the demographic reality of Henan as a densely populated agricultural province. This demographic profile enriches the study's capacity to examine how university support systems nurture psychological capital and career adaptability among diverse student groups. Finally, 68.3% ($n = 329$) of participants reported holding student leadership roles, ensuring that a significant portion of the sample possessed direct, frequent interactions with campus support services and digital administrative platforms.

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	249	51.7
	Female	233	48.3
Age	18–20 years	73	15.1
	21–23 years	207	42.9
	24–26 years	138	28.6
	26 and above	64	13.3
Level of Education	Freshman	106	22.0
	Sophomore	154	32.0
	Junior	131	27.2
	Senior	91	18.9
School Type	Public college	148	30.7
	Private college	334	69.3
Major Category	Humanities and Social Sciences	89	18.5
	Economics and Management	111	23.0
	Natural Sciences	104	21.6
	Engineering	114	23.7
	Medicine and Health Sciences	9	1.9
	Education	31	6.4
	Others	24	5.0
Origin	Urban	169	35.1

Variable	Category	Frequency (n)	Percentage (%)
Student Leadership	Rural	313	64.9
	Yes	329	68.3
	No	153	31.7
Total		482	100.0

Reliability Analysis

To assess the internal consistency of the measurement scales, reliability analysis was performed using IBM SPSS Statistics Version 26.0. Following the recommendations of Nunnally (1978) and Hair et al. (2019), a Cronbach's alpha coefficient of .70 or above indicates acceptable reliability, whereas values above .80 suggest good internal consistency.

As presented in Table 2, the Cronbach's alpha coefficients for all constructs ranged from .858 to .921, indicating satisfactory reliability for every measurement scale. Among the independent variables, Digital Intelligence Service Support recorded a Cronbach's alpha of .862, while Development Empowerment Support achieved a value of .897. The three dimensions of Student Engagement also demonstrated good internal consistency, with alpha coefficients of .874 for Behavioral Engagement, .858 for Emotional Engagement, and .921 for Cognitive Engagement. Likewise, the dependent constructs showed high levels of reliability, including Psychological Capital (alpha = .868), Career Adaptability (alpha = .908), and Civic Literacy (alpha = .896).

Overall, all Cronbach's alpha values exceeded the recommended threshold of .70, confirming that the measurement scales used in this study possess adequate internal consistency and are suitable for subsequent validity assessment and structural equation modeling analyses.

Table 2: Reliability Analysis

Variable)	Cronbach's α
DSS	.862
DES	.897
BE	.874
EE	.858
CE	.921
PC	.868
CA	.908
CL	.896

KMO Measure and Bartlett's Test of Sphericity

Before conducting factor analysis, the suitability of the data was examined using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity. As shown in Table 6, the KMO value was .941, which exceeds the recommended threshold of .60 and is considered excellent according to Kaiser (1974), indicating that the sample was adequate for factor analysis. In addition, Bartlett's Test of Sphericity was statistically significant (Approx. $\chi^2 = 13,216.958$, $df = 861$, $p < .001$), suggesting that the correlation matrix was not an identity matrix and that sufficient correlations existed among the measurement items. These results confirm that the data were appropriate for factor analysis and provide support for the subsequent exploratory and confirmatory factor analyses.

Table 3: Results of the KMO Measure and Bartlett's Test of Sphericity

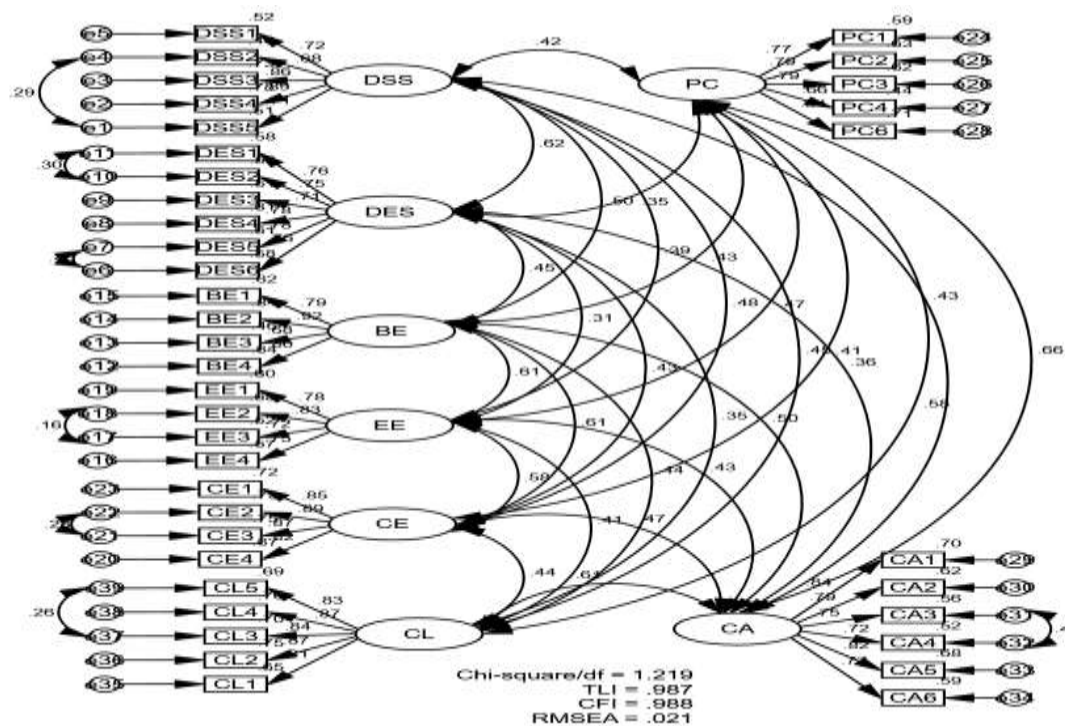
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.941
Bartlett's Test of Sphericity	Approx. Chi-Square 13216.958

df	861
Sig.	.000

Measurement Model

The confirmatory factor analysis (CFA) executed via IBM SPSS AMOS demonstrated an exceptional goodness-of-fit for the overall measurement model. As presented in the statistical summary, the normed chi-square value ($\chi^2/df = 1.219$) fell well within the ideal threshold of below 3.0. Incremental fit indices yielded outstanding parameters, with both the Tucker-Lewis Index ($TLI = .987$) and the Comparative Fit Index ($CFI = .988$) significantly surpassing the recommended benchmark of .90. Furthermore, the absolute fit index reflected superior model precision, as the Root Mean Square Error of Approximation ($RMSEA = .021$) was well below the strict limit of .05. Additionally, all standardized factor loadings across the latent constructs exceeded the .50 cutoff, confirming that the operationalized measurement model possesses remarkable construct validity and structural adequacy.

Figure 2: Measurement Model



To evaluate the convergent validity and composite reliability of the measurement model, Composite Reliability (CR) and Average Variance Extracted (AVE) metrics were computed. Following the psychometric criteria established by Fornell and Larcker (1981) and Hair et al. (2019), convergent validity is demonstrated when CR values exceed .70 and AVE values exceed .50. As detailed in Table 4, the CR values for all constructs ranged from .858 to .926, indicating outstanding internal consistency across the latent variables. Furthermore, the AVE values ranged from .593 to .738, with all constructs comfortably exceeding the .50 benchmark. Specifically, Cognitive Engagement and Civic Literacy exhibited particularly high levels of variance explained by their respective indicators. Overall, these statistics confirm robust convergent validity and structural integrity for all operationalized constructs in the measurement model.

Table 4: CR and AVE

Construct	Composite Reliability (CR)	Average Variance Extracted (AVE)
DSS	.882	.603
DES	.897	.593
BE	.878	.645
EE	.858	.602
CE	.918	.738
PC	.881	.599
CA	.903	.609
CL	.926	.713

Structural Path Analysis

The structural equation model executed via IBM SPSS AMOS revealed significant direct relationships across all hypothetical pathways within the Input–Environment–Outcome (I-E-O) architecture. As detailed in Table 5, Student Affairs Supports (SAS) exerts a strong, positive direct effect on Student Engagement (SE) ($\beta=.711$, $b=.844$, $S.E.=.095$, $C.R.=8.868$, $p<.001$), confirming that institutional support infrastructure serves as a primary environmental driver in stimulating student behavioral, emotional, and cognitive involvement. Concurrently, SAS demonstrates a statistically significant direct impact on Students' Comprehensive Qualities (SCQ) ($\beta=.247$, $b=.306$, $S.E.=.109$, $C.R.=2.811$, $p=.005$), establishing that proactive institutional resources and digital-intelligence platforms yield a direct developmental dividend in enhancing holistic capabilities.

Furthermore, Student Engagement (SE) exerts a robust, positive influence on Students' Comprehensive Qualities (SCQ) ($\beta=.552$, $b=.577$, $S.E.=.098$, $C.R.=5.884$, $p<.001$), identifying student involvement as the most influential direct predictor of holistic outcomes. Comparing standardized coefficients (β) indicates that while SAS directly elevates SCQ, its primary role lies in igniting high-level student engagement ($\beta=.711$), which subsequently drives the internal synthesis of psychological capital, career adaptability, and civic literacy. These empirical metrics fully support all direct baseline hypotheses, corroborating the theoretical premise that structured campus environments and active student participation synergistically cultivate comprehensive qualities in higher education.

Figure 3: Structure Model

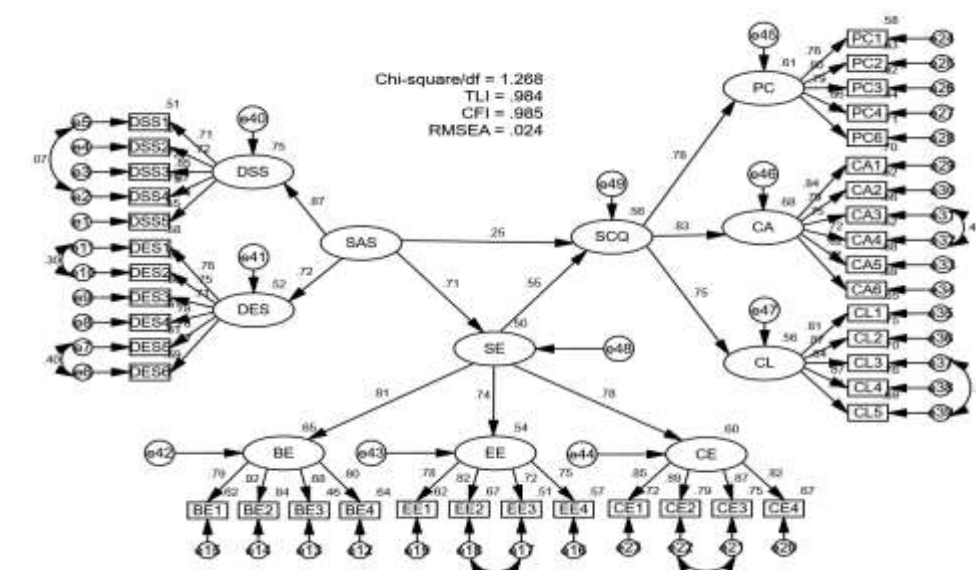


Table 5: Hypothesis Testing Results for Direct Structural Paths

Structural Path	b	S.E.	C.R	p	β	Result
SE ← SAS	.844	.095	8.868	***	.711	Supported
SCQ ← SAS	.306	.109	2.811	.005	.247	Supported
SCQ ← SE	.577	.098	5.884	***	.552	Supported

Mediation Analysis

To formally test the mediating role of Student Engagement (SE) in transmitting the impact of Student Affairs Supports (SAS) onto Students' Comprehensive Qualities (SCQ), a bias-corrected percentile bootstrapping procedure with 5,000 resamples was executed at a 95% confidence interval via IBM SPSS AMOS. As detailed in Table 6, the total effect of SAS on SCQ was statistically significant ($b=.793$, 95% CI [.612,1.016], $p=.001$). When decomposing this total impact, the indirect effect channeled through Student Engagement was found to be highly significant ($b=.487$, 95% CI [.310,.739], $p=.001$), as the 95% confidence interval entirely excluded zero. Concurrently, the direct effect of SAS on SCQ remained statistically significant ($b=.306$, 95% CI [.062,.583], $p=.013$), establishing that Student Engagement serves as a complementary partial mediator in the structural model.

Effect proportion metrics further illustrate the strategic importance of this mediating mechanism. The indirect effect generated through Student Engagement accounted for 61.41% of the total effect, whereas the direct path comprised 38.59%. This dominant effect ratio demonstrates that while institutional supports directly enhance student capabilities, their primary mechanism lies in triggering active student involvement across behavioral, emotional, and cognitive dimensions. In alignment with Astin's Input–Environment–Outcome (I-E-O) framework, these empirical metrics confirm that student engagement acts as the indispensable process engine that converts external university support systems into sustainable comprehensive qualities.

Table 6: Bootstrap Mediation Analysis of Student Engagement Between Student Affairs Supports and Comprehensive Qualities

Effect Type	Point Estimate (b)	95% Bias-Corrected CI	p-value
Indirect Effect (IND)	.487	[.310, .739]	.001
Direct Effect (DE)	.306	[.062, .583]	.013
Total Effect (Total)	.793	[.612, 1.016]	.001

6. Conclusion and Discussion

Based on Astin's Input–Environment–Outcome (I-E-O) framework, this study examined the relationships among Student Affairs Supports (SAS), Student Engagement (SE), and Students' Comprehensive Qualities (SCQ). The measurement model showed satisfactory psychometric properties, with all constructs meeting the recommended criteria for convergent validity and reliability ($CR > .70$ and $AVE > .50$).

The structural model results indicated that all hypothesized relationships were statistically significant ($p < .05$). Student Affairs Supports had a significant positive effect on Student Engagement ($\beta = .711$, $p < .001$) and also exerted a direct positive effect on Students' Comprehensive Qualities ($\beta = .247$, $p = .005$). In addition, Student Engagement was found to be a significant predictor of Students' Comprehensive Qualities ($\beta = .552$, $p < .001$).

The mediation analysis, based on bias-corrected bootstrapping with 5,000 resamples, further indicated that Student Engagement partially mediated the relationship between Student Affairs Supports and Students' Comprehensive Qualities. The indirect effect was statistically significant ($b = .487$, $p = .001$) and accounted for 61.41% of the total effect, suggesting that Student Affairs Supports enhance students' comprehensive qualities

both directly and indirectly through increased student engagement.

Institutional Supports as Environmental Drivers

The strong direct link between Student Affairs Supports and Student Engagement ($\beta=.711$) validates the core premise of institutional support theories, demonstrating that modern administrative infrastructures, specifically digital-intelligence services (DSS) and development empowerment (DES), serve as powerful environmental triggers. Rather than functioning as passive administrative overhead, integrated campus tools (such as real-time analytics, automated learning guidance, and holistic student care) directly lower the psychological and operational friction of academic life. These findings align with recent empirical insights showing that proactive, data-driven campus environments effectively prevent cognitive drift and foster sustained behavioral compliance and emotional belonging.

The Dominant Mediating Engine of Student Engagement

A central theoretical contribution of this study lies in quantifying the mediation mechanics within the I-E-O architecture. While Student Affairs Supports maintain a statistically significant direct path to Comprehensive Qualities ($\beta=.247, 38.59\%$ effect ratio), the vast majority of developmental impact (61.41%) is channeled indirectly through Student Engagement.

This dominant indirect pathway reinforces the agency-centered paradigm of student development: institutional resources cannot mechanically produce long-term student growth in isolation. Instead, macro organizational investments must first be "digested" and converted into active student involvement across behavioral, emotional, and cognitive dimensions. When students actively engage, participating in career initiatives, building institutional belonging, and engaging in deep cognitive reflection, external institutional support is successfully transformed into internal psychological capital, dynamic career adaptability, and civic literacy.

7. Practical and Policy Implications

Shift from "Passive Resource Provision" to "Engagement-Centric Design":

University administrators and student affairs practitioners must recognize that simply increasing the volume of administrative support is insufficient. Design principles should prioritize how services trigger active participation. Digital platforms should incorporate interactive, personalized feedback loops rather than static information delivery to maximize cognitive and behavioral immersion.

Targeted Psychological and Career Empowerment:

Given that student engagement heavily shapes psychological capital and career adaptability, student affairs departments should design development empowerment programs (e.g., mentorship, structured career trajectory planning, resilience workshops) that directly target students' basic psychological needs for autonomy, competence, and relatedness.

Optimizing Support Mechanisms in Developing Higher Education Contexts:

In rapidly expanding, resource-constrained higher education ecosystems (such as regional university hubs), institutions should leverage scalable digital-intelligence infrastructures alongside humanized advisory support. This dual strategy mitigates technological alienation while ensuring equity in student development across diverse

socioeconomic backgrounds.

8. Limitation and Future Directions

Despite its rigorous methodological design, this study presents several limitations that open avenues for future research. First, the cross-sectional survey design, while logically anchored in established chronological higher education models, limits absolute causal inference; future studies should deploy multi-wave longitudinal tracking to capture how engagement trajectories evolve across academic lifecycles. Second, while the sample effectively captures regional diversity across public and private institutions, expanding sampling frames to multi-regional or international comparative contexts would enhance the global generalizability of the structural model. Finally, future investigations could explore contextual boundary conditions, such as grade-level lifecycle moderation or disciplinary variations, to provide more granular, tailored intervention strategies for university management.

Reference

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