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Learning outcomes and quality of educational service as predictors of academic satisfaction among Peruvian university students

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Abstract: This study investigates the extent to which two learning outcome domains—personal and professional competencies, and digital competencies and social responsibility—and two educational service quality dimensions—teaching quality and academic resources/support—predict students' academic satisfaction at a public university in Peru. A cross-sectional survey was administered to 734 undergraduate students aged 18–26 to assess these two learning outcome factors, two service quality factors, and overall satisfaction. Data analysis was conducted using partial least squares structural equation modeling (PLS-SEM) and ANOVA. The model was statistically significant ($p < .001$) and explained approximately 74% of the variance in student satisfaction. Among the predictors, academic resources/support emerged as the strongest, followed by personal/professional competencies and teaching quality. Digital competencies and social responsibility demonstrated a smaller but still significant positive effect. The findings suggest that student satisfaction is primarily driven by the quality of academic resources/support and effective teaching practices, along with robust personal/professional competencies. Conversely, digital competencies and social responsibility have a minor influence on satisfaction unless they are more fully integrated into the curriculum. To enhance student satisfaction, university management should focus on strengthening infrastructure and support services, improving teaching quality, embedding personal/professional competencies into the curriculum, and integrating digital competencies and social responsibility into authentic learning experiences.

Keywords: *Academic services and support, Digital competencies, Higher education, Learning outcomes, Personal and professional competencies, Student satisfaction, Teaching quality, University social responsibility.*

1. Introduction

Contemporary higher education faces the challenge of ensuring not only the acquisition of knowledge, skills, attitudes, and values—known as learning outcomes—but also the provision of a holistic educational experience that satisfies students' expectations and needs. Learning outcomes, shaped by pedagogical, technological, and psychological factors, constitute an essential indicator of academic performance and students' integral development. In this context, educational service quality emerges as a determining element, conceived as a multidimensional construct that spans from instructional planning and organization to the availability of resources, infrastructure, and curricular relevance.

From an operational perspective, learning outcomes include objectively evaluated academic performance, the acquisition of comprehensive competencies (knowledge, skills, attitudes, and values), and the influence of contextual factors such as technology, pedagogy, and the student's psychological

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dimension. Martin Sanz, et al. [1] define performance as the quantitative evaluation of academic achievement by instructors through objective tests, whereas broader approaches highlight measurable learning results in terms of knowledge and values acquired throughout the educational experience.

This theoretical model recognizes that learning outcomes are strongly conditioned by the educational environment, particularly by the quality of service received and by students' academic satisfaction. The literature suggests that pedagogical approaches such as blended learning positively affect student satisfaction and, consequently, performance [2]. Likewise, improving learning outcomes is a priority objective for higher education institutions, and the use of educational technologies is a key enabling factor for achieving it.

Educational service quality in the university context can be understood as a multidimensional construct that integrates transformative, perceptual, and systemic aspects of the formative process. From a transformative perspective, McCowan [3] argues that education quality entails the capacity to generate positive change in the student, fostering the development of deep knowledge, disciplinary skills, and personal, intellectual, and civic competencies. From a systemic view, Cheng and Cheung [4] conceive quality as a set of characteristics that respond to explicit needs, while Cheng [5] defines it as the articulation of inputs, processes, and outcomes that meet the expectations of internal and external stakeholders in the education system. In the same vein, other authors underscore the importance of instructional planning and organization, curricular content, and outcomes as key dimensions in managing quality education [6, 7].

From a user-centered standpoint, service quality is defined as the extent to which perceived services meet or exceed customer expectations [8]. This perspective is fundamental in higher education, where the student is understood as an active recipient of the educational service. Chaudhary and Dey [9] broaden this conception by noting that educational service quality as perceived by students encompasses components such as teaching, administrative services, academic facilities, campus infrastructure, support services, and internationalization.

Academic satisfaction is conceived as the student's subjective and favorable evaluation of the overall academic experience, considering the extent to which teaching–learning processes, institutional services, and achieved outcomes meet or exceed expectations [10]. This construct integrates academic components—such as the quality and relevance of content, the methodology employed, the effectiveness of assessment, and the availability of resources—together with psychosocial factors such as motivation, received feedback, and sense of belonging to the institution [11]. From a predictive standpoint, academic satisfaction is configured as an outcome mediated by perceived educational service quality and by achieved learning outcomes, becoming a key indicator of student well-being and commitment to the formative process [12].

Within higher education, academic satisfaction functions as a multidimensional construct that connects perceptions of educational quality with academic persistence and performance. Factors such as effective interaction with faculty, the professional relevance of content, the pertinence of feedback, and access to adequate resources enhance intrinsic motivation and the perception of achievement [11]. In this way, a virtuous cycle among satisfaction, learning, and performance is generated, which not only improves the university experience but also strengthens persistence and student success. Consequently, academic satisfaction becomes a fundamental criterion for evaluating institutional effectiveness and for formulating strategies aimed at the continuous improvement of educational service quality [10, 11].

Recent research has shown that academic satisfaction acts as a mediating variable between educational service quality and learning outcomes [13, 14] playing a strategic role in student retention and continuous improvement. Its development depends on curricular coherence, the professional relevance of content, the quality of academic interactions, and the perception of personal achievement [15, 16]. Moreover, international studies indicate that academic satisfaction is influenced by the quality of the e-learning system [17] the effectiveness of educational services [18, 19] and universities' sustainable practices [9]. In this sense, understanding and enhancing academic satisfaction not only

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strengthens the student experience but also constitutes a central axis for educational quality policies in both face-to-face and virtual contexts [20-23].

This study underscores the need to understand how learning outcomes—understood as academic performance and the integral development of competencies under the influence of contextual factors—and educational service quality—conceived as a multidimensional construct that articulates inputs, processes, and outcomes—shape university academic satisfaction, which integrates perceptions of content, methodology, feedback, resources, and psychosocial factors. This analysis is relevant because the literature shows that academic satisfaction acts as a mediating variable between educational quality and learning outcomes, influencing motivation, persistence, and student success, thereby enabling universities to craft policies and pedagogical strategies that enhance the academic experience, optimize institutional management, and strengthen their competitiveness in the global context.

2. Theoretical Basis and Hypothesis Development

2.1. Theoretical Foundation

2.1.1. Learning Outcomes

Learning outcomes are the measurable results of learning that evidence a student's academic performance. They encompass both the objective assessment of achievement and the development of comprehensive competencies—knowledge, skills, attitudes, and values—acquired during training, and are influenced by contextual factors such as technology, pedagogy, and the student's psychological dimensions [1, 2].

2.1.2. Quality of Educational Service

Quality of educational service in the university context is a multidimensional construct that articulates educational inputs, processes, and outcomes to meet the needs and expectations of system stakeholders. It integrates transformative, perceptual, and user-centered aspects and is evaluated by the extent to which teaching, services, infrastructure, and academic support meet or exceed students' expectations [3-5].

2.1.3. Academic Satisfaction

Academic satisfaction is the student's subjective and favorable evaluation of the overall academic experience. It is determined by perceived educational service quality and attained learning outcomes, and integrates academic factors—such as content, methodology, and assessment—and psychosocial factors—such as motivation, feedback, and sense of belonging. It thus constitutes a key indicator of student well-being, retention, and educational success [10-12].

2.2. Research Hypothesis

In this study, four hypotheses were formulated to examine the relationships between learning outcomes, quality of educational service, and academic satisfaction among university students. These hypotheses aim to identify the extent to which different dimensions—ranging from digital and professional skills to teaching quality and academic resources—predict students' satisfaction with their academic experience. The proposed hypotheses are as follows:

- H1: Digital competencies and social responsibility exert a positive effect on students' academic satisfaction.
- H2: There is a positive relationship between professional and personal skills and students' academic satisfaction.
- H3: Higher teaching quality is positively associated with students' academic satisfaction.
- H4: The quality of academic resources and support services is positively related to students' academic satisfaction.

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3. Materials and Methods

The study employed an explanatory, non-experimental, cross-sectional quantitative design. The sample comprised 734 students from the Education degree program at a public university in Peru. Participants were between 18 and 26 years old (M = 19.8; SD = 1.73), with a gender distribution of 32% men (N = 235) and 68% women (N = 499).

Data were collected via a survey administered between June and July 2025, after obtaining informed consent from all participants. The instrument, developed specifically for this study, measured four predictor variables: Digital Competencies and Social Responsibility (DCSR), Professional and Personal Competencies (PPC), Quality of Service: Teaching (QST), and Quality of Service: Academic Resources and Support (QSARS). The endogenous variable was Academic Satisfaction (SAT). Responses were rated on a 5-point Likert scale ranging from (1) Strongly Disagree to (5) Strongly Agree. Data processing and analysis were conducted using SmartPLS (v. 4.1.0.9), applying the multiple regression analysis module.

4. Results

Table 1 reports a multiple linear regression model with academic satisfaction as the dependent variable and four predictors: Digital Competencies and Social Responsibility (DCSR), Professional and Personal Competencies (PPC), Quality of Service: Academic Resources and Support (QSARS), and Quality of Service: Teaching (QST). All estimated coefficients are positive and—except for the intercept—reach statistical significance at $\alpha = 0.05$, suggesting that each dimension contributes, with varying magnitude, to variation in student satisfaction:

Table 1.
Summary Coefficients.

Predictor variable	Unstandardized coefficients	Standardized coefficients	SE	t value	p value	2.50%	97.50%
Digital Competencies and Social Responsibility (DCSR)	0.082	0.081	0.041	2	0.046	0.002	0.162
Professional and Personal Competencies (PPC)	0.268	0.27	0.06	4.467	0	0.151	0.389
Quality of Service: Academic Resources and Support (QSARS)	0.355	0.358	0.053	6.698	0	0.254	0.46
Quality of Service: Teaching (QST)	0.259	0.262	0.054	4.796	0	0.153	0.37
Intercept	0.005	0.005	0.028	0.179	0.858	-0.05	0.06

From the comparison of standardized coefficients, QSARS emerges as the most relevant determinant ($\beta = 0.358$; $p < .001$), followed by PPC ($\beta = 0.270$; $p < .001$) and QST ($\beta = 0.262$; $p < .001$). Substantively, this indicates that better provision of academic resources and institutional support is the factor with the greatest explanatory power for satisfaction; secondarily, the development of personal/professional competencies and teaching quality exhibit moderate but robust effects. DCSR shows a smaller positive effect ($\beta = 0.081$; $p = .046$), with borderline empirical evidence.

Interpreting the unstandardized coefficients allows the expected changes on the satisfaction scale to be gauged (assuming homogeneous Likert-type metrics). A one-point increase in QSARS is associated with +0.355 points in satisfaction (95% CI [0.254, 0.460]); for PPC, the expected change is +0.268 (95% CI [0.151, 0.389]); and for QST, +0.259 (95% CI [0.153, 0.370]). For DCSR, the estimated effect is +0.082 (95% CI [0.002, 0.162]), with an interval that barely excludes zero, suggesting a small contribution potentially sensitive to model specification or sample size. The intercept does not differ

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from zero (p = .858), which is consistent with centered variables or with the constant term lacking substantive meaning in this context.

In light of these results, the specific hypotheses are supported: DCSR predicts satisfaction, albeit with a small effect size; PPC and QST show moderate and statistically robust effects; and QSARS emerges as the principal determinant. This prioritizes, in university management terms, investment in academic infrastructure, platforms, and support services, without neglecting programs to strengthen transversal competencies and improve teaching practices (active learning methods, timely feedback, and formative assessment). The digital–social responsibility dimension, while significant, would require more authentic curricular integration—linked to performance tasks and assessments—to increase its perceptible impact on satisfaction.

For a more complete report and assessment of model fit, it would be pertinent to report R^2 and adjusted R^2, the model F statistic, and standard diagnostics: verification of multicollinearity (e.g., VIF), residual analysis (normality, homoscedasticity, and independence), and influence tests (Cook's distance). Likewise, sensitivity analyses excluding DCSR or partial re-specifications would allow the stability of the main coefficients and the robustness of the inferences to be assessed. In sum, academic satisfaction is explained primarily by the quality of resources and institutional support, and secondarily by competency development and teaching; digital competence and social responsibility show room for improvement through pedagogical alignment with assessable learning outcomes.

Table 2 summarizes the partition of variance for the multiple regression model predicting academic satisfaction. The total sum of squares (SST = 308; df = 733) is decomposed into the regression sum of squares (SSR = 227.79; df = 4) and the error sum of squares (SSE = 80.21; df = 729). From this decomposition one obtains $R^2 \approx 0.740$ (227.79/308) and adjusted $R^2 \approx 0.738$ (1 − MSE/MST), indicating that the set of predictors explains about 74% of the observed variability in academic satisfaction—a high level of explanation for educational studies using Likert-type variables:

Table 2.
Summary ANOVA.

Source	Sum of squares	df (degrees of freedom)	Mean square	F	p-value
Total	308	733	—	—	—
Error	80.21	729	0.11	—	—
Regression	227.79	4	56.948	517.71	0

When comparing mean squares, MSR (= SSR/df_reg) is 56.948 and MSE (= SSE/df_error) is ≈ 0.110, so the F statistic is 517.71 (MSR/MSE), with $p < .001$. This result confirms that, overall, the model has significant predictive capability: at least one of the regression coefficients differs from zero. With an implied sample size of n = 734 (df_total = n − 1), statistical power is high and the estimates are precise. Moreover, RMSE ≈ 0.332 (√MSE) suggests that prediction errors average around one-third of a point on the dependent variable's scale, which is consistent with a substantively good fit in the context of 1-to-5 measurements.

Substantively, these indicators support that the included dimensions (digital competencies and social responsibility, personal and professional competencies, teaching quality, and academic resources/support) jointly contribute to student satisfaction. Nonetheless, the global F test does not indicate which predictors are most influential; that hierarchy is established with the coefficients table (Table 1). Even so, the magnitude of R^2 indicates that service quality and learning outcomes capture core components of the student experience at this public university.

For rigor, this ANOVA should be accompanied by model diagnostics: (i) verify multicollinearity (VIF), especially if high correlations exist among predictors; (ii) check assumptions of normality, homoscedasticity, and independence of residuals; and (iii) explore the sensitivity of the fit (e.g., re-estimating without a given block of predictors) to confirm the robustness of R^2 and F. Taken together, the ANOVA evidence supports the model's global validity and justifies interpreting the specific effects reported by the coefficients.

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Table 3 shows positive, high-magnitude associations among all study variables. In direct relation to academic satisfaction (SAT), the largest coefficient corresponds to QSARS (r = 0.812), followed by QST (r = 0.795), PPC (r = 0.790), and, to a lesser extent, DCSR (r = 0.640). At the bivariate level, these figures imply that variation in SAT is substantially explained by each dimension considered separately: approximately, QSARS accounts for 66% of the variance in SAT ($r^2 \approx 0.676$), QST around 63% ($r^2 \approx 0.632$), PPC 62% ($r^2 \approx 0.624$), and DCSR 41% ($r^2 \approx 0.410$). Substantively, academic support and infrastructure, teaching quality, and personal/professional competencies are strongly associated with academic well-being; digital competencies and social responsibility also show an important association, albeit of smaller relative magnitude:

Table 3.
Correlations.

	(DCSR)	(PPC)	(QSARS)	(QST)	(SAT)
Digital Competences and Social Responsibility (DCSR)	1	0.782	0.635	0.615	0.64
Professional and Personal Competences (PPC)	0.782	1	0.772	0.781	0.79
Quality of Service: Academic Resources and Support (QSARS)	0.635	0.772	1	0.822	0.812
Quality of Service: Teaching (QST)	0.615	0.781	0.822	1	0.795
Satisfaction (SAT)	0.64	0.79	0.812	0.795	1

A salient feature of the matrix is the high intercorrelation among predictors: QSARS–QST reaches r = 0.822 ($r^2 \approx 0.676$), PPC–QST r = 0.781 ($r^2 \approx 0.610$), and PPC–QSARS r = 0.772 ($r^2 \approx 0.596$). These values suggest substantive overlap among the constructs, likely because they capture proximate facets of a global perception of institutional quality/support and the learning experience. In modeling terms, such a pattern increases the risk of multicollinearity, with the effect of inflating standard errors and recalibrating unique effect sizes in multiple regression. This helps explain why, even though DCSR exhibits a moderately high bivariate correlation with SAT (r = 0.640), its unique contribution in the model (once overlap with QSARS, QST, and PPC is controlled) may be modest or even marginal.

From a discriminant validity standpoint, correlations in the 0.80–0.82 range (QSARS–QST) are a red flag: there may be conceptual redundancy between teaching quality and resources/support, or an unmodeled common latent factor (e.g., "perceived educational service quality"). Methodologically, it is advisable to test these constructs via confirmatory factor analysis and criteria such as Fornell–Larcker (the square root of each construct's AVE should exceed its correlations with others) or the HTMT index (ideally < 0.85 conservatively, < 0.90 as a looser threshold). Likewise, given the self-reported nature and simultaneous measurement, common method variance cannot be ruled out; its evaluation (e.g., with a common latent factor in CFA) would provide additional evidence.

Interpretively, the hierarchy of correlations with SAT suggests that institutional strategies that strengthen academic resources and support, together with improvements in teaching and the development of personal/professional competencies, have greater potential to affect student satisfaction. Digital competencies and social responsibility, while relevant, may require more authentic curricular integration (linked to performance tasks and formative assessment) to translate into perceptible gains in satisfaction. Finally, given the observed collinearity, bivariate analysis should be interpreted with caution: the prioritization of interventions should rely on partial effects estimated by multiple regression and on sensitivity/robustness analyses (e.g., blockwise hierarchical models, VIF checks, and coefficient stability tests).

Figure 1 depicts a multiple regression model with standardized coefficients in which academic satisfaction is the dependent variable. The value 0.732 inside the Satisfaction box corresponds to the model's R^2, indicating that 73.2% of the variance in satisfaction is jointly explained by the included predictors. The estimated intercept is 0.000 with p = 1.000, and thus provides no substantive information for interpretation:

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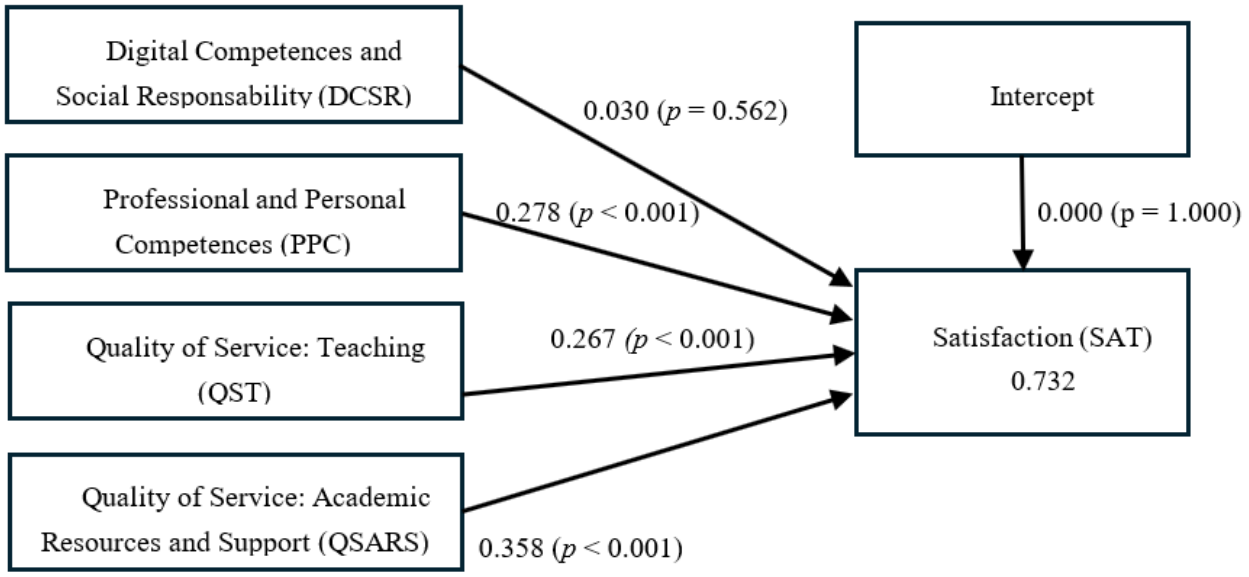

Figure 1.
Regression model with standardised coefficients and significance level p-values.

Regarding effect sizes, the path from Quality of Service: Academic Resources and Support (QSARS) to Satisfaction is the largest ($\beta = 0.358$, $p < .001$), followed closely by Personal and Professional Competencies (PPC; $\beta = 0.278$, $p < .001$) and Quality of Teaching (QST; $\beta = 0.267$, $p < .001$). The path from Digital Competencies and Social Responsibility (DCSR) is small and non-significant ($\beta = 0.030$, $p = .562$). In terms of relative importance, the hierarchy is clear: QSARS exerts the strongest unique effect, while PPC and QST show moderate, robust effects; DCSR does not contribute independently once the other dimensions are controlled.

Substantively, the findings suggest that perceptions of institutional resources and supports—academic infrastructure, LMS functioning, tutoring, and advising—constitute the primary determinant of student satisfaction. Second, the development of personal and professional competencies, together with teaching quality—active methodologies, timely feedback, and formative assessment—exerts a significant and consistent influence. By contrast, the digital–civic dimension does not add additional explained variance once the others are considered, which may reflect overlap with QSARS and QST or, alternatively, an as-yet insufficient curricular integration of these competencies into performance tasks and authentic assessment.

From a methodological standpoint, the expected high interrelation among predictors advises checking potential multicollinearity via VIF and, if necessary, complementing with relative-importance analyses or blockwise hierarchical models to pinpoint each construct's unique contribution. If the analysis was conducted with PLS and bootstrap resampling, it is appropriate to report the quality of the measurement model first (composite reliability, AVE, Fornell–Larcker and HTMT criteria) before drawing conclusions about structural paths. Likewise, any discrepancies in the significance of DCSR relative to other outputs should be cross-checked to ensure the same run, standardization, and sample were used.

In terms of implications, the evidence supports prioritizing interventions in academic resources and supports, consolidating the development of transversal competencies, and strengthening teaching practice. In parallel, digital competencies and social responsibility could be reframed by embedding them in authentic, performance-based assessment activities aligned with learning outcomes, so that their impact on satisfaction is clearer and more sustainable.

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5. Discussion

The results show a globally robust model (Table 2), with $F = 517.71$; $p < .001$ and $R^2 \approx 0.74$, indicating that the combination of service quality and learning outcomes explains a large share of the variability in academic satisfaction. This magnitude is consistent with evidence assigning substantial weight to educational service quality for satisfaction and, through it, for performance [13, 14]. In the Peruvian case, the importance of quality policies and infrastructure has likewise been documented as a direct determinant of the student experience [15].

In the analysis of unique effects (Table 1), QSARS is the strongest predictor ($\beta = 0.358$; $p < .001$), followed by PPC ($\beta = 0.270$; $p < .001$) and QST ($\beta = 0.262$; $p < .001$). This pattern supports the literature linking resources, equipment, access, and supports with higher satisfaction levels [9, 18, 19, 22] and with better outcomes via the mediating role of satisfaction [14]. Regarding teaching, evidence underscores that instructional management, interaction, and feedback from instructors are determinants of satisfaction in both face-to-face and online settings [2, 16, 24]. The PPC effect aligns with findings in which course management, interaction, and autonomous work translate into higher satisfaction and performance [25] and with satisfaction frameworks that explicitly incorporate educational outcomes as a key dimension [13].

The DCSR effect is small but significant ($\beta = 0.081$; $p = .046$), and its interval borders zero, suggesting sensitivity to model specifications. This nuances the evidence on educational technology: when design and support are robust, satisfaction can match (or surpass) face-to-face formats [10, 16] but in certain contexts students report lower satisfaction in online modalities, especially due to a weaker sense of connection and interaction [11]. Likewise, the adoption of TEL and self-efficacy are positively associated with satisfaction when supports, subjective norms, virtual social skills, and information quality are present [12] and when instructors communicate and mediate actively [24]. Concrete instructional interventions—e.g., the flipped classroom—also increase achievement and satisfaction [26]. In the local context, frequency of use, attitudes, and ICT knowledge raise satisfaction, though not always performance [27]. Taken together, these precedents explain why DCSR's unique contribution may diminish once resources and teaching are controlled.

The correlation matrix (Table 3) reveals high associations among predictors and with satisfaction (QSARS–SAT $r = 0.812$; QST–SAT $r = 0.795$; PPC–SAT $r = 0.790$). The collinearity between QSARS and QST ($r = 0.822$) suggests content overlap and the possible existence of a higher-order factor of "perceived service quality," consistent with multidimensional frameworks [13, 20, 21]. Methodologically, this calls for reporting VIF and, ideally, testing discriminant validity with CFA/HTMT before overemphasizing differences among unique effects.

The observed pattern also aligns with studies positioning content, system, and service quality as foundations of e-learning satisfaction [17] and with work showing that perceived service strongly impacts satisfaction [19] and that SERVQUAL indicators are associated with "satisfactory" yet improvable levels [18, 22, 23]. At the policy level, Peruvian evidence underscores that licensing, accreditation, and funding condition sustainable improvements in the experience [15] which is consistent with the weight of QSARS in this study.

Regarding modality, the literature is nuanced: there are contexts where no differences in satisfaction or performance are observed among face-to-face, synchronous, and asynchronous formats when the course is well designed [10, 16] whereas in selective institutions face-to-face delivery still reports advantages in perceived quality and institutional identification [11]. This contrast suggests that DCSR effects depend on instructional design, instructor communication, and institutional support [12, 24] rather than on the mere presence of technology.

In terms of implications, the results prioritize investments in academic resources and supports (physical/digital libraries, a stable and usable LMS, tutoring, academic advising) and in strengthening teaching (interaction, feedback, formative assessment), alongside the explicit development of transversal competencies (PPC) as part of assessable learning outcomes [2, 9, 21]. For DCSR to gain traction, it

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should be articulated with authentic tasks and performance criteria, supported by institutional backing and a learning community [12, 24, 26].

Limitations inherent to the cross-sectional design and self-reported measures suggest caution due to common method variance. It is recommended to assess mediational models (e.g., service quality → satisfaction → performance), already empirically supported [14] and to explore contextual moderators (teaching leadership, which does not always alter the relationship [19] and course modality [10, 11]. Future studies could compare face-to-face, blended, and online formats under equivalent design standards [2, 16] and take into account the local regulatory and quality framework [15].

6. Conclusion

The overall model is solid: it explains about 74% of the variance in academic satisfaction and is statistically significant ($F = 517.71$; $p < .001$). Taken together, this confirms that the combination of learning outcomes and quality of educational service constitutes a consistent explanatory framework for student satisfaction in the public university analyzed, in line with evidence linking service quality, satisfaction, and academic outcomes [13-15].

Regarding H1, digital competencies and social responsibility (DCSR) show a positive but small and borderline effect ($\beta = 0.081$; $p = 0.046$). This finding suggests that its contribution depends strongly on instructional design, instructor communication, and institutional support: when courses are well designed, satisfaction can match or exceed face-to-face formats, but in other contexts a weaker sense of connection and interaction reduces students' appraisal [10-12, 24]. In local contexts, ICT use and attitudes raise satisfaction without necessarily translating into better performance, which helps explain the observed effect size [27].

For H2, professional and personal competencies (PPC) exhibit a moderate, robust effect on satisfaction ($\beta = 0.270$; $p < .001$). This result aligns with the conception of learning outcomes as integral achievements—knowledge, skills, attitudes, and values—that, when explicitly developed and assessed, are associated with higher satisfaction and, ultimately, better performance [1, 2].

For H3, teaching quality (QST) is also positively and moderately associated with satisfaction ($\beta = 0.262$; $p < .001$). The literature converges on meaningful interaction, timely feedback, and active learning as determinants of the student experience, regardless of modality, provided the course is well structured and the instructor manages pedagogical communication appropriately [10, 11, 16, 24].

For H4, quality of academic resources and support (QSARS) emerges as the primary determinant of satisfaction ($\beta = 0.358$; $p < .001$). The centrality of physical/digital libraries, a stable and usable LMS, tutoring, and academic advising is consistent with service-quality frameworks in which inputs and supports sustain the learning experience and raise satisfaction [9, 13, 18, 19, 22] and with the Peruvian regulatory context that emphasizes licensing, accreditation, and infrastructure investment [15, 27].

All four hypotheses are confirmed, with a clear hierarchy: first QSARS, then PPC and QST, and finally DCSR with a small effect. This reinforces the theoretical link between quality of educational service and learning outcomes as predictors of academic satisfaction, and suggests that the greatest room for improvement lies in strengthening supports/infrastructure and teaching practices; at the same time, the impact of the digital–civic dimension will grow if articulated with authentic tasks and formative assessment. Moreover, the literature indicates that satisfaction may mediate the effects of service quality on performance, so future interventions should explicitly consider this mechanism [2, 13, 14].

Under these considerations, interventions should first strengthen academic resources and supports (QSARS)—a stable, monitored LMS; current physical/digital libraries; multichannel help desk; tutoring and academic advising—and, in parallel, enhance teaching quality (QST) through ongoing training in active methodologies, formative assessment, and timely feedback. PPC should be explicitly integrated and assessed in the curriculum via capstone/integrative projects and outcome-aligned rubrics, and DCSR reframed by linking digital competencies and social responsibility to performance tasks (service-

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learning, projects with organizations) and digital citizenship/ethics pathways. All of this should follow instructional design standards (e.g., constructive alignment, UDL, Quality Matters criteria) with clear expectations for interaction and quality equivalence across face-to-face, hybrid, and online delivery.

At the governance level, establish measurement and continuous improvement with KPI dashboards by dimension, pulse surveys, and LMS analytics embedded in PDSA cycles; ensure methodological rigor (VIF, residual checks, CFA/HTMT, relative-importance analyses) given the observed collinearity. For equity and access, implement device/data-plan lending, downloadable resources, and study spaces, alongside onboarding, peer mentoring, and psychosocial support to bolster the student experience. Finally, align evidence with licensing/accreditation and launch an evaluation agenda to test mediations (quality → satisfaction → performance), conduct longitudinal follow-ups, and pilot instructional redesigns prior to institutional scaling.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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