

Designing meaning and momentum: A value-integrated academic services framework for distance education



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ABSTRACT

This study develops, validates, and tests a Transformative Academic Service Framework (TASF) for graduate distance education—grounded in service-dominant logic, transformative learning, and values-based education—to deliver human-centered services that advance engagement, values formation, and wellbeing. Design-based, convergent mixed methods paired iterative framework development with a quasi-experimental rollout across five centers (students = 247; faculty = 32; staff = 15). Validation used four-factor CFA ($\alpha = 0.88\text{--}0.91$); fidelity was tracked via audits/LMS/training logs; outcomes were tested with 2×2 repeated-measures ANOVAs and SEM (multi-group invariance, bootstrapped mediation), and interviews/FGDs underwent reflexive thematic analysis. Good model fit ($\chi^2/df = 2.14$, CFI = 0.94, TLI = 0.93, RMSEA = 0.067; AVE ≥ 0.56) held under metric-scalar invariance ($|\Delta CFI| \leq 0.010$; $|\Delta RMSEA| \leq 0.009$); fidelity was high (SOP 92.4%, micro-reflection 85.6%, training 91–94%), and all outcomes showed time $\times$ group effects (all $ps < 0.001$; partial $\eta^2 \geq 0.22$) with large gains in the implementation arm (mean $d = 1.13$, 95% CI [0.98, 1.28]). In SEM, Integrative Service Design predicted Academic Engagement ($\beta = 0.34$) and Values-Embedded Processes predicted Values Integration ($\beta = 0.42$); both mediators predicted Academic Wellbeing ($\beta = 0.28$, $\beta = 0.33$) with significant bootstrapped indirect effects ($\beta = 0.09\text{--}0.14$), corroborated by qualitative themes of belonging, purpose, self-efficacy, and feedback loops. TASF, a validated high-fidelity framework, measurably improves service quality, engagement, values integration, and academic wellbeing in distance higher education, offering a scalable blueprint for human-centered, outcomes-oriented academic services by embedding values into integrative service design and reflective routines.

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1. Introduction

Distance/online higher education is growing rapidly post-pandemic, shifting the emphasis from mere administrative efficiency to an ecosystem of academic services that shapes the overall learning experience and student achievement (Martin et al., 2020). A systematic review of online teaching demonstrates the need for proactive and evidence-based support design to maintain the quality of

experience and learning readiness (Martin et al., 2020; Martin and Bolliger, 2022). In the context of ODL, family/work factors, access, and social interaction shape student satisfaction and persistence, so that services cannot be reduced to technical performance alone (Waterhouse et al., 2022). Recent meta-analyses confirm a strong link between learning engagement and academic outcomes, reinforcing the argument that services should be designed to trigger cognitive-affective engagement, not just behavioral (de Pedro et al., 2025). At the same time, learning analytics research shows that measurement practices are often biased towards click/duration indicators, thus ignoring affective and social dimensions, signaling the need for richer service indicators (Bergdahl et al., 2024). At the level of the learning framework, Community of Inquiry (CoI) and transactional distance remain

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relevant for designing meaningful interactions across disciplines (Martin et al., 2022; Richardson et al., 2025). Thus, the quality agenda in distance higher education needs to shift from "measuring service satisfaction" to "designing services as a meaningful educational experience" (Bergdahl et al., 2024; Martin et al., 2020; Richardson et al., 2025; Waterhouse et al., 2022).

Beyond the technical aspects, value-based and character-based education has resurfaced in universities with an emphasis on moral virtues, responsibility, and academic meaning—pillars that have been proven to support the wellbeing and sense of belonging of students (Arthur, 2024; Li et al., 2025). A design-based study of ethics in virtual learning shows that values such as responsibility, commitment, and respect can be operationalized as everyday ethical experiences in a digital space (Piragauta and de Oliveira, 2023). Meanwhile, the surge in generative AI adoption presents ethical challenges regarding accountability, transparency, and fairness, prompting universities to formulate human-centered AI policy frameworks (Chan, 2023; Dabis and Csáki, 2024). Initial policy responses in various countries show the need for governance that ensures academic integrity as well as responsible AI literacy for the community (Dabis and Csáki, 2024). A comprehensive AI policy framework in higher education demands the orchestration of academic service roles—from academic guidance and counseling to quality assurance—so that values and ethics do not stop at the curriculum, but animate operational processes (Chan, 2023). This implication broadens the definition of service quality: not just speed/responsiveness, but also value alignment, ethical clarity, and meaningful experience. As such, value integration needs to be designed and measured at the service level as an integral part of academic quality (Arthur, 2024; Chan, 2023; Dabis and Csáki, 2024; Piragauta and de Oliveira, 2023).

The Service-Dominant Logic (SDL) lens offers a conceptual shift from "service delivery" towards value co-creation between institutions, service staff, faculty, and students; cutting-edge conceptual/empirical evidence suggests co-creation improves student experience, relationships, and empowerment (Lubicz-Nawrocka and Bovill, 2023). In practice, cross-context co-creation projects have shown benefits in learning, wellbeing, and ownership, but the standardization of service protocols and the conditions for the success of staff-student partnerships are still limited (Lee et al., 2025). At the same time, meta-analyses and CoI studies suggest designing different social-cognitive teaching presences across disciplines, so adaptive and equitable service guidance is needed (Martin et al., 2022; Richardson et al., 2025). In the context of learning personalization, meta-analytical findings demonstrate the effectiveness of personalized TEL interventions, suggesting that support services need to be aligned with the needs, preferences, and values of adult learners. However, without measurement instruments that capture the dimensions of value

and reflection, organizations tend to revert to shallow technical metrics (Bergdahl et al., 2024). Therefore, a framework that combines SDL, CoI/transactional distance, and reflective mechanisms is needed to guide the remote service architecture (Bergdahl et al., 2024; Lubicz-Nawrocka and Bovill, 2023; Martin et al., 2022; Richardson et al., 2025).

Based on the knowledge map above, the crucial gap remains gaping: there is no measurable academic services framework that explicitly blends quality management with a value-based approach for graduate students in a remote environment. Online student support reviews affirm the importance of embedding support throughout the learning cycle, but rarely operationalize the value/ethics component in service procedures (Rotar, 2022). In terms of quality, recent studies on service quality show an influence on satisfaction/retention, but are still oriented towards the functional dimension rather than the development of the whole human being (Surya Bahadur et al., 2024). Meanwhile, ODL research underscores the significance of work/family contexts and access inequalities—demanding responsive, inclusive, and equitable service models (Wani et al., 2023; Waterhouse et al., 2022). Addressing these gaps, this study develops and validates a Design-Based Research-based Transformative Academic Service Framework, which integrates integrative service design, value-charged processes, holistic support, and reflective practices. The novelty of the research lies in the operationalization of values into procedures, measurement instruments, and implementation guidelines that can be replicated across distance learning centers. The objectives of the research are: synthesize the principles of quality and value into the service framework, develop/validate measurement instruments, and test their impact on engagement, satisfaction, and quality perception in the distance learning ecosystem (Rotar, 2022; Surya Bahadur et al., 2024; Wani et al., 2023; Waterhouse et al., 2022).

2. Literature review

2.1. Academic service quality in distance education

Recent research on academic services in higher education confirms that service quality cannot be reduced to administrative efficiency, but must underpin student engagement, meaningfulness, and success in the online space (Martin et al., 2020; Richardson et al., 2025). Recent systematic reviews of online academic support show the need to integrate support across the learning cycle—from orientation, academic advising, digital/AI literacy, to psychosocial services—and emphasize the importance of evidence-based evaluation of intervention effectiveness. On the measurement side, service research is still dominated by the SERVQUAL/HedPERF model and its derivatives, but

this tendency has been criticized for emphasizing the functional dimension and ignoring the value experience and reflection of adult students (Yaşar et al., 2026).

Bibliometric studies of SERVQUAL in universities confirm the breadth of adoption and trend of the topic—but it also opens up space for the expansion of indicators to aspects of ethics, inclusion, and co-creation. Especially in the context of ODL/online, the post-pandemic transition has revealed service gaps in access, social interaction, and evaluation design—which has an impact on satisfaction and persistence (Martin et al., 2020). In many programs, the quality indicator is still biased towards click/screen time behavior, whereas the engagement literature shows stronger academic outcomes when services encourage cognitive-affective engagement and community support. Therefore, the service quality framework in a remote environment needs to integrate TQM standards, multidimensional engagement indicators, and context-sensitive reflective mechanisms (Basnet et al., 2026). This synthesis underscores the urgency of designing services as an educational experience—not just an administrative process—with metrics that capture engagement, meaning, and value (Martin et al., 2020; Richardson et al., 2025).

2.2. Values-based education theory (higher education)

The latest wave of value-based education at universities places the formation of character, responsibility, and virtue as legitimate goals of higher education—as well as calling for value to be integrated with service practices and institutional policies (Arthur, 2024). Bibliometric evidence shows that the moral education research ecosystem is growing and intersecting with the fields of educational psychology and policy, indicating the need for sharper instruments to assess the internalization of values in adult students (Hoxha and Vinson, 2025). In the realm of e-learning, a value-based approach also emerges through an adoption framework that links the perception of utilitarian-hedonic benefits, trust, and value with the resilience of the learning system, showing that the "value" variable can be operationalized in the design of digital services (Sun et al., 2024).

As the adoption of generative AI increases, universities are beginning to develop human-centered AI policy frameworks to maintain academic integrity, transparency, and fairness in support and assessment services (Chan, 2023; Dabis and Csáki, 2024). The literature also highlights that successful value integration requires capacity building of educators and service staff, including ethical guidelines, value-based decision-making training, and accountability mechanisms, so that value does not stop at the curriculum, but animates service "touch-points" (Arthur, 2024; Chan, 2023). The next challenge is to ensure cultural diversity and fairness are reflected in service policies, so that integrated

values are not monolithic and sensitive to the context of adult students. Therefore, the theory of VBE in higher education needs to be downgraded to operational service protocols, assessment indicators, and explicit governance for online/ODL spaces (Arthur, 2024; Chan, 2023; Dabis and Csáki, 2024; Sun et al., 2024).

2.3. Transformative learning in adult/graduate education

Transformative Learning (TL) remains a powerful lens for understanding how adult learners transform their frames of reference through critical reflection, dialogue, and action—and recent literature maps the expansion of TL into digital, interdisciplinary, and formative assessment contexts. Recent studies emphasize that the design of experiences (teaching/social/cognitive presence) in the Community of Inquiry needs to be adapted across disciplines, reinforcing the argument that academic services should facilitate spaces for reflective dialogue and a sense of community as a prerequisite for transformation.

Empirically, cutting-edge quantitative reviews and studies associate TL practices and strong CoI presence with better attitudes, motivation, and learning capabilities—indicating the need for services that orchestrate mentoring, discourse facilitation, and feedback that encourages perspective-taking (Martin et al., 2020). In the online context, post-pandemic evidence suggests that the success of transformation is not only determined by platforms, but by the ecology of support that provides room for disorienting managed dilemmas (e.g., AI ethics, cross-cultural collaboration) and structured reflective schemas (Bourlakis et al., 2026).

Thus, TL hints at service indicators that go beyond satisfaction—for example, changes in goal orientation, agency, and personal-professional value integration—that must be captured by measurement instruments and evaluation practices (Richardson et al., 2025). The remaining gap is the lack of academic service models that operationalize TL in the realm of institutional services (not just classroom pedagogy), including co-creation mechanisms and reflection-based continuous improvement cycles. This is the foundation for your framework that combines integrative design dimensions, value processes, holistic support, and reflective practices (Martin et al., 2020; Richardson et al., 2025).

3. Methodology

3.1. Research design

This study employed a design-based research (DBR) approach integrated with a sequential mixed-methods design to develop and evaluate the Transformative Academic Service Framework (TASF) within an authentic higher-education

environment. Design-based research was selected because it allows researchers to iteratively design, implement, and refine educational interventions while simultaneously generating both theoretical insight and practical guidance for institutional practice. The research unfolded through four interconnected phases.

The initial phase involved analysis and exploration, including a synthesis of the literature, a needs assessment, and a scoping study of existing academic service practices in distance education. The second phase focused on framework design and instrument development, translating conceptual principles into operational service components and measurable constructs. The third phase involved implementation and empirical testing through a controlled quasi-experimental design, enabling the estimation of the framework's impact on key student outcomes. Finally, the fourth phase consisted of reflection and refinement, where quantitative and qualitative evidence were integrated to evaluate the framework and inform subsequent improvement. To capture both implementation dynamics and outcome effects, the study combined large-scale survey data with qualitative inquiry, including interviews, focus group discussions, and structured observations. Structural relationships among variables were examined using covariance-based structural equation modeling in line with contemporary SEM guidance (Thitalampoon et al., 2026).

3.2. Participants and research setting

The study was conducted across five distance-learning centers within a national open-university system, representing a distributed environment typical of large-scale distance higher education. Participants included three stakeholder groups who are directly involved in academic service delivery and experience: graduate students, faculty members, and academic service staff. The student sample consisted of 247 graduate students aged between 25 and 55 years ($M = 34.2$, $SD = 8.7$), of whom 64% were female.

Faculty participants included 32 lecturers with an average teaching experience of 12.4 years ($SD = 6.8$), while 15 academic service staff members participated with an average service experience of 8.7 years ($SD = 4.2$). Sampling followed a stratified purposive strategy to ensure representation across study programs and learning centers while maintaining feasibility within the institutional setting. For the intervention test, students were assigned at the class or program level to either an implementation group ($n = 124$) or a comparison group ($n = 123$). This clustered assignment followed existing academic schedules in order to minimize contamination between groups while preserving the natural organization of distance-learning cohorts. Participants were eligible if they were actively enrolled in graduate programs, demonstrated at least 70% activity in the learning management system (LMS), and provided informed consent.

Students on academic leave or those unable to participate in the minimum intervention activities were excluded from the analysis.

3.3. Intervention: Transformative academic service framework

The intervention implemented in this study was the Transformative Academic Service Framework (TASF), which was designed to embed human-centered academic services within the operational ecosystem of distance higher education. The framework integrates four complementary components that correspond to key academic service touchpoints. The first component, integrative service design, emphasizes cross-functional coordination among academic, administrative, and student support units in order to ensure coherent service delivery. This dimension includes holistic needs assessment, accessible service channels, and inclusive service procedures that respond to the diverse circumstances of distance learners. The second component, values-embedded processes, operationalizes ethical principles within everyday service interactions, including transparency, accountability, cultural responsiveness, and social responsibility. The third component, holistic student support, extends academic services beyond administrative assistance to include mentoring, academic coaching, peer collaboration facilitation, and wellbeing support. Finally, reflective practice mechanisms introduce structured feedback loops that enable continuous service improvement through student voice, staff reflection, and institutional learning.

Implementation lasted one academic semester (approximately 16 weeks) and involved several coordinated activities. These included two staff training sessions (2×6 hours), revisions of service standard operating procedures, the integration of ethical micro-guidelines at key service touchpoints, and the introduction of reflective mechanisms within the LMS environment. Students in the implementation group engaged with short micro-reflection prompts, ethics-oriented service consultations, and two-way feedback forums designed to capture their experiences throughout the semester. In contrast, the comparison group continued to receive business-as-usual academic services, allowing the evaluation of the framework's impact under realistic institutional conditions. Implementation fidelity was monitored using LMS activity logs, SOP compliance checklists, and monthly quality-assurance audits.

3.4. Instruments

Four instruments were used to capture the principal constructs examined in this study. The Transformative Academic Service Scale (TASS) consisted of 48 Likert-type items designed to measure four dimensions of the framework: integrative service design, values-embedded

processes, holistic student support, and reflective practice mechanisms. Each dimension was designed to achieve internal consistency levels of $\alpha \geq 0.85$ and was evaluated through exploratory and confirmatory factor analysis. Student engagement was measured using an adapted version of the Student Engagement Inventory (SEI) comprising 24 items representing behavioral, affective, and cognitive engagement within distance-learning environments. Perceived service quality was assessed through the Academic Service Quality Scale (ASQS), which adapts the HEDPERF and SERVQUAL traditions to the context of distance education while incorporating experiential and value-based dimensions of academic services (Lu et al., 2023). Finally, the Values Integration Assessment (VIA) measured students' perceptions of how values such as responsibility, integrity, care, and social contribution were integrated within their academic experiences.

All instruments employed a five-point Likert response scale and used a four-week recall window to ensure consistency of reporting. Reverse-coded items were processed according to instrument guidelines, and composite scores were calculated as mean values for each dimension.

3.5. Data collection procedures

Quantitative data were collected at two points in time: pre-implementation (weeks 1–2) and post-implementation (weeks 15–16). Surveys were administered through the institutional LMS and distributed via university email accounts to ensure secure participant identification while maintaining response confidentiality. To complement the quantitative data and explore the mechanisms underlying observed effects, qualitative data were collected through 32 semi-structured interviews, six focus group discussions, and structured observations of academic service interactions. Observations included both online and offline service channels, such as helpdesk communication, LMS forums, and academic consultation sessions. Interview protocols focused on students' lived experiences with academic services, perceptions of value integration, sense of belonging, intrinsic motivation, and ethical aspects of service interactions. All sessions were audio-recorded with participant consent and subsequently transcribed verbatim for analysis.

3.6. Data analysis

Quantitative analyses were conducted using SPSS 28 and AMOS 28 following a two-stage analytical procedure consisting of measurement validation and structural testing. The measurement stage included descriptive statistics, reliability analysis using Cronbach's alpha and composite reliability, and construct validation through confirmatory factor analysis. Model fit was evaluated using widely accepted indices, including χ^2/df , CFI, TLI, RMSEA, and SRMR, following recommendations from

multivariate and SEM literature (Lu et al., 2023; Thitalampoon et al., 2026). To assess the effectiveness of the intervention, repeated-measures ANOVA was employed to examine time $\times$ group interactions across outcome variables, and effect sizes were reported using partial η^2 and Cohen's d .

Structural relationships among service components, student engagement, values integration, and academic wellbeing were subsequently examined using structural equation modeling with robust maximum likelihood estimation. Qualitative data were analyzed using reflexive thematic analysis following the framework proposed by Liu et al. (2025). The analysis proceeded through stages of familiarization with the data, initial coding, theme development, and interpretive synthesis. Mixed-methods integration occurred at the stage of meta-inference, where qualitative findings were used to explain and contextualize the quantitative results.

4. Results

4.1. Preliminary analyses and data screening

To assess distributional assumptions, we inspected Q–Q plots for all pre-intervention variables (Service Quality, Student Satisfaction, Academic Engagement, Values Integration, Academic Wellbeing; Fig. 1). These visual diagnostics provide a concise and interpretable assessment of normality at the scale level and are appropriate for bounded Likert-type data.

Visual inspection of the Q–Q plots (Fig. 1) shows that all scales approximate normal distributions. Most points follow the 45° reference line with only minor tail deviations, a pattern commonly observed in bounded Likert-scale data. With a sample size of $n = 247$, such small departures do not threaten model estimation and remain well within the tolerance of robust SEM estimators (e.g., ML with Satorra-Bentler corrections). In addition, item-level missingness remains uniformly low ($< 3\%$), further supporting the adequacy of distributional assumptions for the planned CFA/SEM and repeated-measures analyses.

4.2. Measurement model: Reliability and validity

Preliminary analysis on the pilot sample ($n = 89$) supports a four-factor solution for TASS ($KMO = 0.89$; Bartlett's $\chi^2 = 3,247.82$, $p < 0.001$), and we therefore tested the structure on the main sample. CFA results show a good model fit in the main sample ($\chi^2/df = 2.14$, CFI = 0.94, TLI = 0.93, RMSEA = 0.067, 90% CI [0.058, 0.076], SRMR = 0.048, GFI = 0.91), with no indication of local misfit requiring model respecification. The constructs demonstrate strong internal and composite reliability ($\alpha \geq 0.88$; $CR \geq 0.90$) together with adequate convergent validity (AVE ≥ 0.56 ; standardized loadings 0.72–0.83).

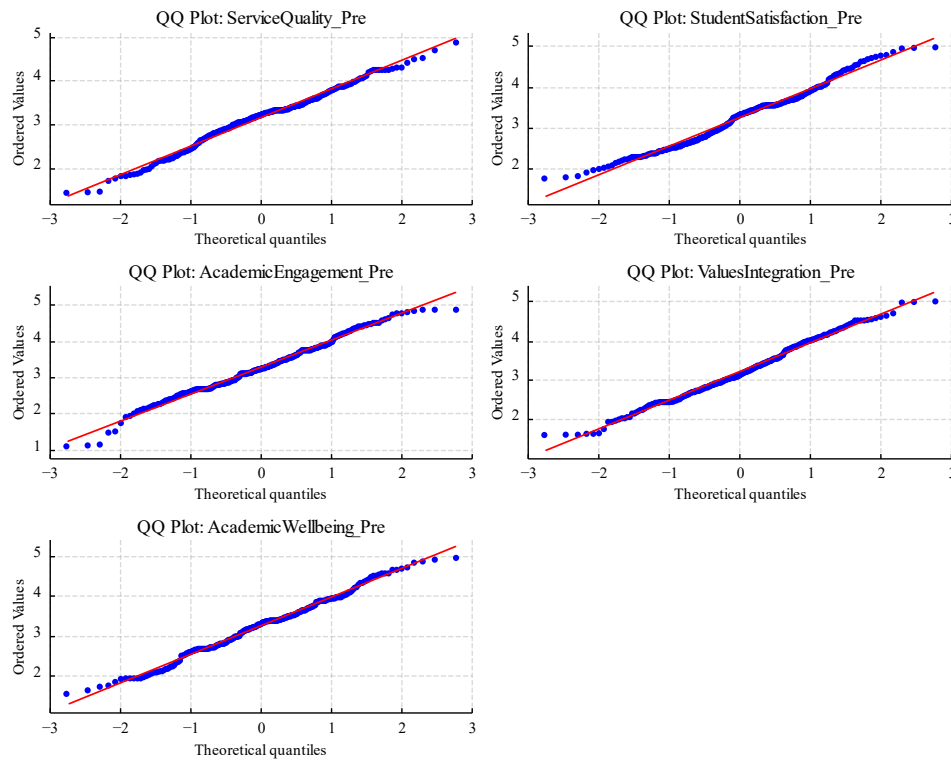


Fig. 1: Q–Q plots of pre-intervention variables

The Fornell–Larcker criterion confirms discriminant validity, as the square root of AVE for each construct exceeds the correlations among constructs ($r = 0.43\text{--}0.67$, all $p < 0.001$), indicating that the four dimensions are related yet empirically distinct. Measurement invariance tests across gender and learning centers meet accepted thresholds (metric vs. configural $\Delta\text{CFI} = 0.003$; scalar vs. metric $\Delta\text{CFI} = 0.007$; $|\Delta\text{RMSEA}| \leq 0.006$), allowing meaningful comparisons of latent constructs across groups. Table 1 summarizes the measurement properties of the model.

Table 1: Measurement properties (CFA; $n = 247$)

Construct	Items	α	CR	AVE	Loading range
Integrative service design	12	0.89	0.91	0.58	0.73–0.82
Values-embedded processes	12	0.91	0.93	0.61	0.74–0.81
Holistic student support	12	0.88	0.90	0.56	0.72–0.83
Reflective practice mechanisms	12	0.90	0.92	0.59	0.73–0.81

Taken together, the CFA results, strong reliability indices, $\text{AVE} \geq 0.50$, and the Fornell–Larcker test indicate a stable and well-specified measurement model for TASS. Establishing both metric and scalar invariance further supports the comparability of latent scores across key subgroups, providing a defensible basis for the subsequent SEM analysis and group comparisons.

4.3. Implementation fidelity

We monitored three fidelity domains—adherence to prescribed procedures, exposure (dosage/uptake) at student touchpoints, and training uptake by

staff—using convergent data sources (SOP process audits, LMS telemetry, and attendance logs). Across service touchpoints, process audits show high adherence (SOP checklist completion = 92.4%), exceeding common benchmarks for implementation quality ($\approx 80\%$). LMS telemetry also shows high student exposure to values-infused reflective routines, with an average 85.6% uptake of micro-reflection prompts in the implementation arm. Attendance records indicate strong staff participation in training, with mean attendance reaching 94% (Session 1) and 91% (Session 2), suggesting adequate capacity-building before and during rollout. Monthly QA checks recorded no serious protocol deviations. Taken together, these indicators suggest that the intervention operated as designed, supporting the internal validity of subsequent effect estimates and reducing the likelihood that implementation drift or dosage shortfall explains the observed outcomes.

Table 2 demonstrates consistently high implementation fidelity across the three key domains—adherence, exposure, and training. First, SOP adherence reached 92.4%, exceeding commonly accepted operational benchmarks ($\approx 80\%$), which reduces the likelihood that uncontrolled implementation variation explains the observed effects. Second, student exposure to reflective routines reached 85.6%, indicating that most participants actively engaged with the core intervention components rather than passively receiving information. Third, training attendance reached 94% (Session 1) and 91% (Session 2), suggesting strong operational readiness among service staff during the rollout. The absence of serious protocol deviations further reduces potential

threats to internal validity, including implementation drift, dosage shortfall, or cross-group contamination.

Overall, this fidelity profile strengthens the causal interpretation of the intervention effects reported in Section 4.4, indicating that improvements in service quality, satisfaction, engagement, values integration, and academic wellbeing likely reflect the impact of

the framework rather than implementation artifacts. Future studies may strengthen this evidence by incorporating post-training competency indicators (e.g., short assessment scores) to evaluate delivery quality and by examining dose-response relationships between micro-reflection uptake and outcome gains.

Table 2: Implementation fidelity indicators, definitions, and data sources

Domain	Indicator (how it was calculated)	Data source	Result
Adherence	% SOP checklist items completed across touchpoints	Process audits (QA)	92.4%
Exposure	% students engaging with micro-reflection prompts (avg. per cycle)	LMS telemetry	85.6%
Training	Staff training attendance (session 1/session 2)	Attendance logs	94%/91%
Deviations	Count of serious protocol deviations	QA deviation log	0

Higher values indicate better fidelity for adherence, exposure, and training; Serious deviations: Events requiring protocol amendment or halting

4.4. Intervention effects (pre-post × group)

A 2 (Time: pre, post) × 2 (Group: implementation, control) repeated-measures ANOVA revealed significant time × group interactions across all outcomes—service quality, student satisfaction, academic engagement, values integration, and academic wellbeing (all p s < 0.001), with large effect sizes (partial $\eta^2 \geq 0.22$). Bonferroni-adjusted post-hoc tests show substantial pre-post gains in the implementation group, whereas changes in the control group remain small. Table 3 summarizes the cell means (SDs) and omnibus test statistics.

Across outcomes, the implementation group shows a large pooled standardized gain (mean $d = 1.13$, 95% CI [0.98, 1.28]), whereas the control group shows only small-to-moderate gains (mean $d = 0.22$, 95% CI [0.09, 0.35]). Sensitivity checks show consistent results across multiple-imputation and listwise-deletion datasets (max $\Delta F = 1.7$; max $\Delta \eta^2 = 0.01$), indicating that the findings are robust to different missing-data treatments. Combined with the high implementation fidelity reported earlier (Section 4.3), these consistent and large time × group interactions indicate that the framework produces substantive improvements across all targeted domains—service quality perceptions, satisfaction, engagement, values integration, and academic

wellbeing—rather than isolated gains in a single outcome.

4.5. Structural model (SEM)

We estimated the hypothesized structural model using robust maximum likelihood estimation (standardized coefficients, robust SEs). The model shows acceptable global fit— $\chi^2(186) = 429.66$, $p < 0.001$; $\chi^2/df = 2.31$; CFI = 0.92; TLI = 0.91; RMSEA = 0.072 (90% CI [0.063, 0.081]); SRMR = 0.051—meeting commonly used benchmarks for theory-congruent models of this complexity. All focal paths are statistically significant and align with the theoretical framework, and the model explains substantial variance in each endogenous construct (engagement = 0.24; values integration = 0.31; student satisfaction = 0.28; academic wellbeing = 0.35). Model comparisons indicate that removing Reflective Practice or collapsing Values-Embedded Processes into Integrative Design significantly worsens model fit (both $\Delta CFI \geq 0.020$; $\Delta \chi^2$, p s < 0.01), supporting the distinct contribution of each framework component. Table 4 reports the standardized path estimates (β), robust standard errors, critical ratios, p values, and 95% confidence intervals.

Table 3: Means (SD) and omnibus tests by condition

Variable	Implementation (n = 124)		Control (n = 123)		Test statistics F(1,245); partial η^2 ; Cohen's d
	Pre	Post	Pre	Post	
Service quality	3.22 (0.71)	4.23 (0.68)***	3.25 (0.69)	3.41 (0.72)	87.23***; 0.26; d = 1.18
Student satisfaction	3.18 (0.67)	4.31 (0.63)***	3.20 (0.71)	3.52 (0.69)*	94.51***; 0.28; d = 1.23
Academic engagement	3.29 (0.74)	4.18 (0.71)***	3.27 (0.72)	3.44 (0.74)	76.89***; 0.24; d = 1.02
Values integration	3.15 (0.68)	4.26 (0.65)***	3.17 (0.70)	3.38 (0.71)*	102.34***; 0.29; d = 1.29
Academic wellbeing	3.33 (0.72)	4.09 (0.69)***	3.31 (0.74)	3.47 (0.73)	68.12***; 0.22; d = 0.95

*: $p < 0.05$; ***: $p < 0.001$; Cohen's d refers to standardized pre-post change within the implementation group

Table 4: Standardized path estimates (robust SEs; n = 247)

Relation	β	SE	CR	p	95% CI
Integrative design → academic engagement	0.34	0.08	4.25	< 0.001	[0.18, 0.50]
Values-embedded processes → values integration	0.42	0.07	6.00	< 0.001	[0.28, 0.56]
Holistic support → student satisfaction	0.39	0.08	4.88	< 0.001	[0.23, 0.55]
Reflective practice → service quality	0.31	0.07	4.43	< 0.001	[0.17, 0.45]
Academic engagement → academic wellbeing	0.28	0.06	4.67	< 0.001	[0.16, 0.40]
Values integration → academic wellbeing	0.33	0.07	4.71	< 0.001	[0.19, 0.47]

β : Standardized coefficient; CR: Critical ratio; All parameters two-tailed.

The upstream service components operate as theorized: Integrative Design predicts Academic

Engagement ($\beta = 0.34$), and Values-Embedded Processes strongly predict Values Integration ($\beta =$

0.42). Together with Holistic Support ($\beta = 0.39 \rightarrow$ Student Satisfaction) and Reflective Practice ($\beta = 0.31 \rightarrow$ Service Quality), these components form two parallel pathways leading to Academic Wellbeing through Engagement ($\beta = 0.28$) and Values Integration ($\beta = 0.33$). This pattern indicates that the framework improves academic wellbeing through both performance-oriented mechanisms (engagement) and meaning-oriented mechanisms (values integration). The poorer fit of constrained alternative models further confirms the multicomponent architecture of the framework and supports retaining all four service dimensions in subsequent policy and implementation guidance.

4.6. Robustness and subgroup checks

To probe mechanisms, we estimated bias-corrected bootstrapped indirect effects for the two theorized mediators. Fig. 2 summarizes the indirect

pathways from service components to Academic Wellbeing. Both mediators exhibit positive, nonzero indirect effects, with 95% BCa confidence intervals excluding zero, indicating statistically reliable indirect effects through engagement- and values-based pathways. This pattern is consistent with the hypothesized theory of change and complements the significant structural paths identified in the SEM.

4.7. Qualitative findings

To explain how the intervention produced change, we mapped qualitative themes to proximal mechanisms and their corresponding SEM links. The integrative Table 5 shows, for each qualitative driver, the immediate mechanism it activates, the aligned structural path(s) in the model (standardized coefficients, β), and the downstream outcome route to academic wellbeing.

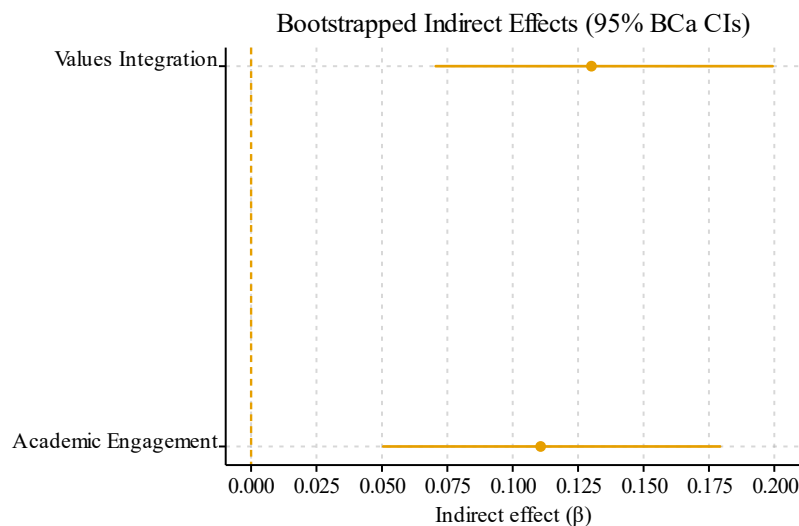


Fig. 2: Bootstrapped indirect effects (95% BCa confidence intervals) via academic engagement and values integration

Table 5: Qualitative drivers, mechanisms, linked SEM paths, and outcome routes to academic wellbeing

Qualitative driver	Proximal mechanism	Links to SEM paths	Downstream outcome
Humane, value-consistent touchpoints	Sense of belonging	Integrative design $\rightarrow$ engagement ($\beta = 0.34$)	Wellbeing via engagement ($\beta = 0.28$)
Purpose-aligned advising	Intrinsic motivation/self-regulation	Values-embedded processes $\rightarrow$ values integration ($\beta = 0.42$) and engagement	Wellbeing via values integration ($\beta = 0.33$)
Mentoring for values articulation	Coherence of personal-professional values	Values integration strengthened	Wellbeing (indirect $\beta \approx 0.09-0.14$)
Holistic support (cognitive-emotional-spiritual)	Self-efficacy, reduced strain	Holistic support $\rightarrow$ satisfaction ($\beta = 0.39$)	Wellbeing (indirect)
Reflective routines & feedback loops	Continuous improvement of service climate	Reflective practice $\rightarrow$ service quality ($\beta = 0.31$)	Engagement & wellbeing (indirect)

Table 5 reveals a dual-path transmission of impact. First, *humane, value-consistent touchpoints* and *holistic support* operate through engagement-related mechanisms—belonging, self-efficacy, and reduced strain—consistent with Integrative Design $\rightarrow$ Engagement ($\beta = 0.34$) and Holistic Support $\rightarrow$ Satisfaction ($\beta = 0.39$), culminating in wellbeing via engagement ($\beta = 0.28$). Second, *purpose-aligned advising* and *mentoring for values articulation* drive values-based mechanisms, aligning with Values-Embedded Processes $\rightarrow$ Values Integration ($\beta = 0.42$)

and the observed indirect effects ($\beta \approx 0.09-0.14$) on wellbeing. *Reflective routines & feedback loops* strengthen the service climate (quality) through Reflective Practice $\rightarrow$ Service Quality ($\beta = 0.31$), reinforcing both engagement and wellbeing indirectly. Together, these linkages explain why the framework improves wellbeing not only by performance/effort (engagement) but also by meaning/coherence (values integration), mirroring the quantitative mediation results and the absence of subgroup moderation.

4.8. Mixed-methods integration

To concisely integrate the quantitative and qualitative findings, we compiled a mixed-methods integration map (Fig. 3). This visual shows how the service components activate two mediating mechanisms—Academic Engagement and Values Integration—which subsequently drive improvements in Academic Wellbeing. The labels on the arrows display the standardized SEM coefficients (β), while the short descriptors in parentheses summarize the qualitative cues explaining how each

service component operates in practice. Fig. 3 illustrates two complementary transmission pathways. First, human-centered and consistent service design strengthens Academic Engagement ($\beta = 0.34$) by fostering a sense of community and efficacy, which in turn improves Academic Wellbeing ($\beta = 0.28$). Second, values-embedded service processes strengthen Values Integration ($\beta = 0.42$) by reinforcing purpose and meaning in academic experiences, and this pathway also contributes to Academic Wellbeing ($\beta = 0.33$).

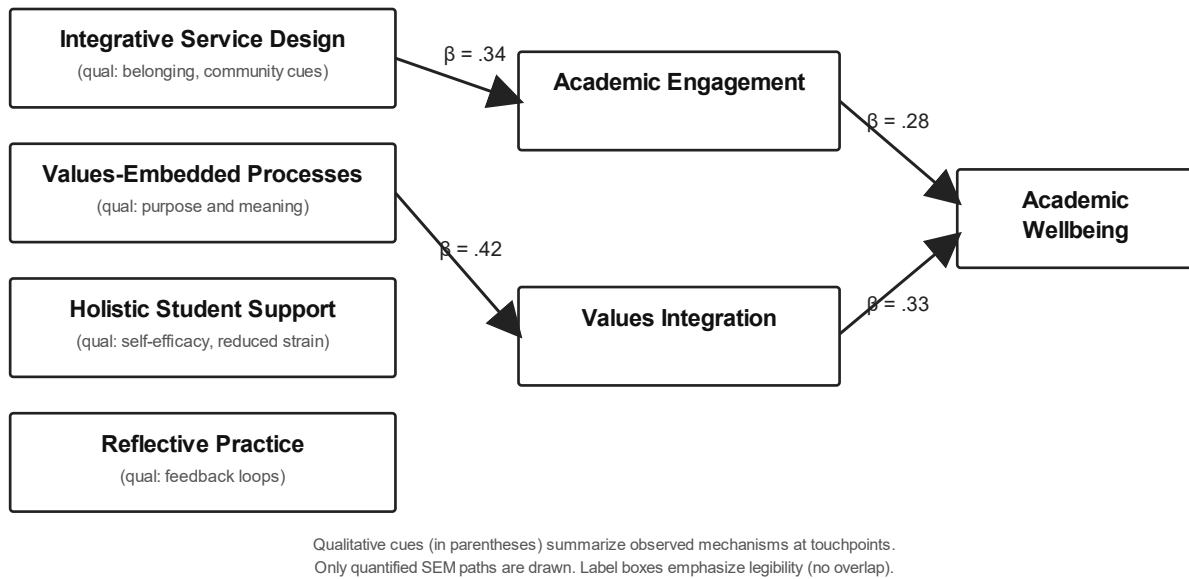


Fig. 3: Mixed-methods integration map linking academic service components to academic engagement and values integration, and their pathways to academic wellbeing

Qualitative cues—belonging, purpose/meaning, self-efficacy, and feedback loops—clarify how these two mediating mechanisms operate simultaneously. As a result, improvements in wellbeing emerge not only through performance-oriented processes (engagement) but also through meaning-oriented processes (values integration). Because the diagram highlights only the four principal structural paths, the visual maintains clarity while integrating the quantitative SEM results with qualitative explanations of service mechanisms.

5. Discussion

The present study shows that the Transformative Academic Service Framework (TASF) improves service quality, student satisfaction, academic engagement, values integration, and academic wellbeing. These improvements appear in significant time $\times$ group interactions and large gains in the intervention group. The findings support research showing that outcomes in online and distance education depend strongly on service design, not only instructional content (Martin et al., 2020; Richardson et al., 2025). CFA results confirm a reliable four-factor measurement structure,

indicating that the TASS indicators capture distinct dimensions of academic service quality (Mehraein et al., 2026). SEM identifies two key pathways: Integrative Service Design $\rightarrow$ Engagement and Values-Embedded Processes $\rightarrow$ Values Integration. Both pathways predict academic wellbeing, consistent with current models of student experience and wellbeing in digital higher education (Zhou et al., 2025). This dual mechanism reflects earlier findings that persistence and wellbeing in online learning depend on both engagement-related processes and meaning-oriented mechanisms such as purpose and value coherence. Overall, these results extend service-dominant views of value co-creation to academic services, showing that institutional service practices can shape engagement and wellbeing (Slimmen et al., 2026). Embedding values within service procedures also responds to calls to humanize digital higher education while maintaining efficiency and scale (Cimino et al., 2026).

Qualitative findings clarify how these mechanisms operate. Students described humane and value-consistent service interactions that strengthened their sense of belonging in mediated learning environments. This observation aligns with

studies showing that social and teaching presence support engagement and persistence in online learning. Purpose-oriented advising and reflection prompts helped students connect coursework with personal goals and broader meaning, supporting research linking identity, purpose, and motivation to engagement and wellbeing (Bergdahl et al., 2024; Cornaglia et al., 2026). Mentoring that clarified personal-professional values aligns with the Values Integration pathway identified in the SEM and with studies showing that value coherence predicts satisfaction and reduced strain. Holistic support addressing cognitive, emotional, and spiritual needs also appears to strengthen academic self-efficacy, a key predictor of effort regulation in online learning (Sun et al., 2026). Staff reflections further suggest that these practices foster a supportive service climate that sustains high-quality delivery (Harahap et al., 2026). Mediation analysis also indicates that engagement and values integration partially transmit the effects of service components on wellbeing, clarifying how the framework produces its impact (Sgherza et al., 2026).

Several factors strengthen the credibility of these findings. Implementation fidelity remained high across adherence, exposure, and staff training, reducing the likelihood that the results reflect execution failure (Eivazinezhad et al., 2025). Measurement invariance also held across gender and learning centers, supporting valid comparisons of latent constructs (Özalp, 2025). Results remained stable across different missing-data treatments, and alternative model comparisons confirmed the distinct contribution of each service component. Effect sizes were comparable to or larger than those reported in recent online education interventions targeting persistence and wellbeing (Härpfer et al., 2026). Although the design is quasi-experimental, the convergence of fidelity, mediation, and qualitative evidence strengthens confidence in the interpretation of the results (Martin et al., 2020).

The findings also offer practical implications for open and distance learning institutions. Universities should strengthen integrative service design by aligning academic, technological, and wellbeing units around shared indicators of engagement and values integration (Hanefar et al., 2026; Sun et al., 2024). Values-based procedures, such as transparency, ethical decision-making, and cultural responsiveness, should be embedded within institutional service operations (Lee et al., 2025). Holistic student support should combine mentoring, peer collaboration, and accessible psychosocial resources, supported by learning analytics that enable timely feedback and reflection. Institutions should also develop reflective practices that create feedback loops between students, staff, and leadership (Sun et al., 2024).

Instruments such as the TASS, combined with service analytics, can help monitor service implementation and outcomes in real time. Framing academic services as value co-creation platforms therefore supports broader human-centered

transformation in digital higher education (Tomaszczyk and Gołda, 2026).

Several limitations should also be considered. The quasi-experimental design limits strong causal inference, and future studies should employ randomized or staggered implementations where possible. The study covers one academic year, so longitudinal research is needed to assess the durability of improvements in engagement and wellbeing (Reid et al., 2026; Sun et al., 2024). Future work could examine dose-response relationships, such as whether mentoring intensity or reflection participation predicts changes in engagement and values integration (Geibler and Wagner, 2026). Additional research should test structural invariance across broader student subgroups to refine equity-sensitive service design (Ding et al., 2026; Li et al., 2026). Cross-cultural studies may also clarify how different value systems shape meaning-making and belonging in diverse distance learning contexts. Multi-site studies will help evaluate how the framework performs across institutional environments while maintaining fidelity and contextual adaptation (Martin et al., 2020; Sun et al., 2024).

6. Conclusion

This study conclusively shows that the Transformative Academic Service Framework (TASF) is a valid and effective approach to improve the quality of the learning experience in distance higher education. Through robust measurement validation (high reliability, adequate AVE, and metric-scalar invariance), large and consistent analysis of intervention effects, and theoretical structural models, TASF has been shown to drive increased Academic Engagement and Values Integration, which in turn strengthens Academic Wellbeing. The integration of quantitative-qualitative findings confirms two complementary pathways of mechanisms—the engagement-based pathway and the meaning-based pathway/value coherence—that work consistently due to high implementation fidelity and reflective processes that keep the feedback loop running. Thus, academic services are no longer just administrative tools, but pedagogical infrastructure that forms humane, meaningful, and performing learning conditions.

The practical implications are stark: institutions need to institutionalize integrative service design across units, standardize value-laden processes in SOPs, strengthen holistic student support, and embed reflective practices as engines of continuous improvement—all monitored by ethical and accountable process analytics. Evidence of large effects, clear mechanism routes, and resilience of results to variations in data handling indicate that TASF is ready to be operationalized on an institutional scale with reasonable contextual adaptation. Going forward, multi-site longitudinal replication and dose-response testing will enrich understanding of the model's limits and cruising

capabilities; but the findings are now enough to position TASF as a strategic playbook for open and distance universities that want to simultaneously improve service quality, engagement, internalization of values, and academic wellbeing. With a scientific foundation and a clear implementation package, TASF offers a credible path to the transformation of high-value-added academic services.

7. Suggestion

Institutions seeking to operationalize the Transformative Academic Service Framework should formalize integrative service design via a cross-functional council that aligns academic, IT, and student-wellbeing units around quarterly OKRs for engagement, values integration, and wellbeing. Embed values-based SOPs (transparency, cultural responsiveness, ethical decision protocols, student voice) at every touchpoint, and scale micro-reflection prompts (≤ 90 seconds, weekly) with gentle nudges in the LMS to sustain meaning-making without fatigue. Provide holistic student support—mentoring, peer collaboration, and rapid psychosocial referral—backed by clear SLAs and warm, human responses. Run scheduled feedback loops (biweekly service huddles) using privacy-respecting service analytics dashboards that track fidelity (SOP adherence, training uptake), quality (ticket response time, first-contact resolution), engagement, values integration, and wellbeing, disaggregated for equity monitoring. Invest in continuous staff development (onboarding and refreshers twice yearly) with brief reflection-on-action to reinforce tone, empathy, and problem-solving. For scale and governance, publish a data-ethics notice, enforce role-based access and audit trails, and communicate improvements back to students each term. Finally, pair implementation with embedded evaluation, mini-TASS/VIA pulses and dose-response analyses of reflection/mentoring intensity, to iteratively tune the model and demonstrate impact to leadership.

List of abbreviations

AI	Artificial intelligence
AMOS	Analysis of moment structures
ANOVA	Analysis of variance
ASQS	Academic service quality scale
AVE	Average variance extracted
BCa	Bias-corrected and accelerated
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CI	Confidence interval
CoI	Community of inquiry
CR	Composite reliability
DBR	Design-based research
FGD	Focus group discussion
GFI	Goodness-of-fit index
HEdPERF	Higher education performance
IT	Information technology
KMO	Kaiser-Meyer-Olkin
LMS	Learning management system

ML	Maximum likelihood
ODL	Open and distance learning
OKRs	Objectives and key results
QA	Quality assurance
Q-Q	Quantile-quantile
RMSEA	Root mean square error of approximation
SD	Standard deviation
SDL	Service-dominant logic
SE	Standard error
SEI	Student engagement inventory
SEM	Structural equation modeling
SERVQUAL	Service quality
SLAs	Service-level agreements
SOP	Standard operating procedure
SPSS	Statistical Package for the Social Sciences
SRMR	Standardized root mean square residual
TASF	Transformative academic service framework
TASS	Transformative Academic Service Scale
TEL	Technology-enhanced learning
TL	Transformative learning
TLI	Tucker-Lewis index
TQM	Total quality management
VBE	Values-based education
VIA	Values integration assessment

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Compliance with ethical standards

Ethical considerations

Ethical approval was obtained from the Research Ethics Committee of Universitas Terbuka, Indonesia (Approval No. EC-UT/045/2025, issued on 12 May 2025). All participants provided informed consent before participation. Participation was voluntary, and all data were treated confidentially and anonymized for research purposes.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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