Journal of Digital Ecosystem for Natural Sustainability (JoDENS)
Vol.6, No.1, Juli 2026, pp. 1~8
e-ISSN: 2798-6179
DOI: https://doi.org/10.63643/jodens.v6i1.366

Website Quality Evaluation of Engineering Faculty Using IPA-WebQual 4.0: A Mixed-Methods Approach for User-Centered Redesign

Aldiyanto Gunawan [1], Kurniawan Hamidi [2]*
[1,2] *Program Studi Teknik Industri, Universitas Universal, Batam, Indonesia*
**Corresponding author E-mail: kurniawan.hamidi@uvers.ac.id*

Article Info

Article history:

Received 23-06-2026
Revised 20-07-2026
Accepted 25-07-2026

Keyword:

Importance-Performance Analysis, UI Design, User Satisfaction, WebQual4.0, Website Evaluation

ABSTRACT

University faculty websites serve as the primary medium of academic communication, information dissemination, and institutional branding. Suboptimal website quality directly undermines user satisfaction and institutional credibility. This study evaluates the Faculty of Engineering website at Universitas Universal using the Importance-Performance Analysis (IPA) method integrated with the WebQual 4.0 framework, encompassing usability, information quality, and service interaction quality dimensions. A quantitative survey was conducted involving 30 purposively selected respondents (active students, lecturers, administrative staff, and alumni) who had accessed the website within the preceding six months. Instrument validity was confirmed through corrected item-total correlation ($r > 0.361$) and reliability via Cronbach's Alpha ($\alpha = 0.936$ and 0.938 for performance and importance dimensions, respectively). IPA analysis positioned 14 attributes within a Cartesian quadrant matrix, revealing that four critical attributes fell in Quadrant I (high importance, low performance): internship opportunity information, job vacancy information for alumni, current engineering articles, and visual identity. The overall conformity level was 65%, indicating a significant performance-expectation gap. Based on these findings, three alternative website redesign concepts were developed using Odoo Website Builder, addressing the priority improvement areas. The proposed design incorporates modern UI principles (Poppins typography, card-based layouts, segmented content architecture) and new functional pages for career development. This study contributes a replicable IPA-WebQual evaluation framework applicable across higher education digital platforms.

I. INTRODUCTION

Digital transformation in higher education has fundamentally repositioned institutional websites from static information repositories to dynamic, multi-stakeholder engagement platforms [1], a trajectory substantiated by systematic literature reviews documenting sustained digital transformation investment across higher education institutions worldwide [2]. A university faculty website simultaneously serves prospective students seeking program information, current students tracking academic schedules, lecturers publishing research outputs, alumni pursuing career development, and the general public forming institutional impressions. This multiplicity of user roles and information needs creates inherent complexity in website design and governance.

Despite the strategic importance of academic websites, a persistent quality gap has been documented across Indonesian higher education institutions. Studies by [3], [4] demonstrated that navigation clarity, visual appeal, and content currency consistently emerge as under-performing dimensions despite their high perceived importance among users. A related study by [5] further established that information quality deficits —

particularly regarding recency and completeness — represent the most critical failure mode in Indonesian academic websites.

The Faculty of Engineering at Universitas Universal (UVERS) is not exempt from these systemic challenges. Preliminary observations and informal user interviews revealed specific deficiencies: absence of internship and job vacancy pages, outdated visual design failing to reflect institutional identity, and infrequent content updates. These observations align with the broader pattern identified in the literature, yet no systematic, data-driven evaluation had previously been conducted for this faculty's digital presence.

The Importance-Performance Analysis (IPA), originally proposed by [6], provides a parsimonious yet strategically powerful framework for evaluating service quality gaps. By simultaneously measuring user-perceived importance and actual performance of service attributes, IPA generates a four-quadrant Cartesian matrix that directly prioritizes resource allocation for improvement. Methodological critiques of the conventional scale-centered approach to quadrant boundary placement have noted its susceptibility to ceiling effects, whereby respondents' tendency toward uniformly high ratings can inflate the apparent size of high-performance quadrants [7]; this study addresses that limitation by anchoring quadrant boundaries in the empirically observed grand mean rather than the scale midpoint, consistent with recommended practice. When combined with the WebQual 4.0 model [8] — which structures website quality assessment across usability, information quality, and service interaction quality — the resulting IPA-WebQual integration yields both diagnostic depth and prescriptive clarity.

This study therefore pursues two interconnected objectives: (1) to rigorously evaluate the current UVERS Engineering Faculty website using the IPA-WebQual 4.0 framework, identifying critical performance gaps based on user perception; and (2) to develop IPA-informed alternative website designs that systematically address the identified priority improvement areas. The study contributes to the growing literature on digital service quality in Indonesian higher education and offers a methodologically sound template replicable across similar institutional contexts.

Academic website quality encompasses the extent to which a website fulfills its intended functions of facilitating academic activities, institutional communication, and information dissemination [9]. Wilson et al. conceptualize service quality as the discrepancy between customer expectations and actual service delivery — a framework equally applicable to digital service contexts [10]. In the higher education domain, this expectation-performance gap is particularly consequential because website quality directly shapes institutional reputation and user trust [11]. This expectation-performance dynamic is not unique to the Indonesian setting: recent evidence from European higher education institutions similarly links e-service quality dimensions — including website performance and information quality — to student satisfaction, loyalty, and word-of-mouth behavior [12], underscoring the cross-national relevance of the evaluation framework applied in this study. The WebQual 4.0 model provides a comprehensive three-dimensional framework for measuring website quality. The usability dimension captures ease of use, navigation clarity, and aesthetic appeal. Information quality encompasses accuracy, relevance, currency, and completeness of content. Service interaction quality reflects the quality of user-website interactions, including perceived security, trust, and community engagement features. Multiple studies have validated WebQual 4.0's applicability in Indonesian higher education contexts [11], [13], [14].

IPA operationalizes service gap analysis through a two-dimensional scatter plot where the x-axis represents performance scores, and the y-axis represents importance scores. The grand mean of each dimension defines the quadrant boundaries, yielding four strategic zones: Quadrant I (Concentrate Here): high importance, low performance — immediate priority; Quadrant II (Keep Up the Good Work): high importance, high performance — maintain; Quadrant III (Low Priority): low importance, low performance — minimal attention required; and Quadrant IV (Possible Overkill): low importance, high performance—potential resource reallocation opportunity. The conformity level (Tki), calculated as the ratio of performance score to importance score expressed as a percentage, provides a quantitative summary measure of the overall gap. Values below 100% indicate unmet expectations; lower values signal greater urgency for improvement. IPA has been extensively applied in academic website evaluation [3], [13], e-learning system assessment [11], e-campus evaluation [14], and public service quality studies [15].

While IPA-WebQual integration has been applied across multiple Indonesian higher education websites, several research gaps persist. First, most existing studies focus solely on evaluation without proposing concrete design interventions grounded in the IPA findings; for instance, [13] and [14] both report quadrant positioning and priority attributes for their respective institutional websites but stop short of translating these findings into functional design specifications. Second, few studies explicitly link findings from Quadrant I to functional page design specifications in a systematic manner. Third, the application of modern UI/UX principles (responsive design, card-based architecture, typography standards) as design solutions to IPA-identified deficiencies has not been formally documented. Fourth, despite well-documented methodological limitations of the scale-centered IPA approach [7], most website evaluation studies do not explicitly report how quadrant boundaries were derived or address the potential for ceiling-effect bias, limiting the interpretive rigor of their quadrant assignments. This study addresses all four gaps by combining empirical IPA evaluation — with quadrant boundaries anchored in the grand mean to mitigate ceiling-effect bias — with structured design development, creating a complete evaluation-to-redesign pipeline.

II. RESEARCH METHODOLOGY

This study employs a mixed-methods approach with a quantitative core supplemented by qualitative design development. The quantitative phase involves survey-based data collection and IPA statistical analysis to identify performance-importance gaps. The qualitative phase translates IPA findings into website design specifications through structured prototyping. This sequential explanatory design [16] ensures that design decisions are firmly anchored in empirical user perception data.

The measurement instrument comprises 14 items operationalizing the three WebQual 4.0 dimensions (Table 1). Items were adapted from validated instruments in [13], [14] to reflect the specific context of the UVERS Engineering Faculty website. Each item was measured on a five-point Likert scale for both perceived performance (1 = very poor to 5 = excellent) and perceived importance (1 = not important at all to 5 = very important).

Table 1. WebQual 4.0 Measurement Instrument

Code	Dimension	Indicator Item	WebQual 4.0 Sub-construct
U1	Usability	Page layout is easy to understand and not confusing	Ease of Navigation
U2		Navigation menu is clear and easy to use	Ease of Navigation
U3		Visual design is attractive and reflects Faculty of Engineering identity	Visual Appeal
I1	Info Quality	Information is available in easily understandable language	Understandability
I2		Information is always updated and not outdated	Currency
I3		Available information is diverse and varied	Completeness
I4		Website provides relevant internship opportunity information for students	Relevance
I5		Website provides job vacancy information for alumni after graduation	Relevance
I6		Academic information (schedules, calendar, advisors) is complete and accessible	Completeness
I7		Website provides current articles related to the field of engineering	Currency/Relevance
I8		Student organization and faculty activity information is fully available	Completeness
I9		Website displays faculty service hours and operational schedules clearly	Completeness
Q1	Service Interaction	Website facilitates access to forms and online administrative services	Service Quality
Q2		Website provides FAQ or self-service guidance for users	Service Quality

The target population comprised all active users of the UVERS Engineering Faculty website, including students, lecturers, administrative staff, and alumni. Given the exploratory-evaluative nature of the study and alignment with IPA minimum sample guidelines [6], [17], a minimum of 30 respondents was established as the threshold for analytical validity. Non-probability purposive sampling was employed, with the screening criterion that respondents must have accessed the faculty website within the previous six months. This criterion ensures that evaluations reflect current user experience rather than recalled impressions of outdated versions.

Data collection was conducted via a structured online questionnaire distributed through academic channels during July–August 2025. The final analytical sample comprised 30 respondents: students (n = 18; 60%), alumni (n = 8; 27%), lecturers (n = 3; 10%), and administrative staff (n = 1; 3%). While acknowledging the sample size limitation relative to probability sampling standards, the homogeneity of the target group and the consistency of instrument psychometrics support the validity of the derived conclusions.

Construct validity was assessed using corrected item-total correlation (r), with items validated at r > r-table (r-table = 0.361 for n = 30, $\alpha = 0.05$, two-tailed). Internal consistency reliability was measured using Cronbach's Alpha, with the threshold of $\alpha \geq 0.70$ adopted per standard psychometric convention [18].

The IPA procedure followed a three-stage sequence. First, item-level mean scores were computed for both performance ($\bar{X}_i$) and importance ($\bar{Y}_i$) dimensions. Second, the conformity level (Tki) for each attribute was calculated as

$$Tki = \frac{\bar{X}_i}{\bar{Y}_i} \times 100\% \quad (1)$$

Third, attributes were plotted on a Cartesian matrix with the overall mean performance

$$\bar{\bar{X}} = \sum_{i=1}^{n} \frac{X_i}{n} \quad (2)$$

and the overall mean importance

$$\bar{\bar{Y}} = \sum_{i=1}^{n} \frac{Y_i}{n} \quad (3)$$

defining the quadrant boundaries. Attributes in each quadrant were then interpreted to inform design prioritization. This grand-mean-anchoring approach was deliberately adopted in place of a fixed scale-midpoint threshold to mitigate the ceiling-effect bias documented in the IPA literature [7], whereby respondent ratings that skew uniformly toward the upper end of the scale can artificially inflate the proportion of attributes classified as high-performing or high-importance under a midpoint-based threshold; this methodological choice

is empirically evaluated against the study's own data in Section III.

Design alternatives were developed using Odoo Website Builder, an enterprise-grade CMS platform that enables simultaneous design and functionality prototyping. The design development process followed a structured workflow: (1) mapping Quadrant I attributes to functional page requirements; (2) establishing design principles based on Nielsen's usability heuristics [19]; (3) developing page wireframes; (4) implementing visual design using Poppins typography and a blue-white institutional color palette; and (5) documenting design rationale for each page relative to IPA findings.

III. RESULTS AND DISCUSSION

All 14 items demonstrated acceptable validity ($r > 0.361$) across both performance and importance dimensions (Table 2). Performance dimension r-values ranged from 0.513 to 0.898, while importance dimension r-values ranged from 0.482 to 0.867. The Cronbach's Alpha for the performance dimension was $\alpha = 0.936$ and for the importance dimension $\alpha = 0.938$, both substantially exceeding the 0.70 threshold (Table 3). These psychometric properties confirm that the instrument reliably measures the intended constructs with high internal consistency, supporting the validity of subsequent IPA findings.

Table 2. Validity Test Results (r-computed vs. r-table = 0.361)

Code	Attribute	r (performance)	r (importance)	status
U1	Layout easy to understand	0.574	0.781	Valid
U2	Navigation menu clear	0.527	0.585	
U3	Visual design attractive	0.764	0.626	
I1	Information understandable	0.726	0.7	
I2	Information updated	0.855	0.774	
I3	Information diverse	0.731	0.867	
I4	Internship information	0.898	0.773	
I5	Job vacancy for alumni	0.774	0.798	
I6	Academic info complete	0.803	0.764	
I7	Current engineering articles	0.829	0.482	
I8	Student org info complete	0.512	0.824	
I9	Service hours displayed	0.863	0.764	
Q1	Online admin form access	0.709	0.812	
Q2	FAQ/self-service guide	0.751	0.865	

Table 3. Reliability Test Results

Dimension	Cronbach's Alpha (α)	Minimum Threshold	Status
Performance (X)	0.936	0.7	Reliable
Importance (Y)	0.938	0.7	

Table 4 presents the mean performance and importance scores, conformity levels, and quadrant assignments for all 14 attributes. The overall conformity level was 65.3%, substantially below the 100% benchmark, indicating that website performance falls significantly short of user expectations across the measurement domain. Item-level conformity ranged from 47.3% (I4: internship information) to 78.8% (U2 and Q1), with six attributes achieving conformity below 60%.

Table 4. IPA Mean Scores, Conformity Levels, and Quadrant Assignments

Attribute Code	Mean of Performance ($\bar{X}$)	Mean of Importance ($\bar{Y}$)	Tki (%)	Quadrant
U1	2.70	3.63	74.4	II (Keep Up)
U2	2.97	3.77	78.8	II (Keep Up)
U3	2.13	3.73	57.1	**I (Priority)**
I1	2.63	3.70	71.1	II (Keep Up)
I2	2.07	3.53	58.6	III (Low Priority)
I3	2.17	3.50	62	III (Low Priority)
I4	1.73	3.67	47.3	**I (Priority)**
I5	2.10	3.73	56.3	**I (Priority)**
I6	2.20	3.43	64.1	III (Low Priority)
I7	2.07	3.67	56.4	**I (Priority)**
I8	2.63	3.33	79	IV (Overkill)
I9	2.27	3.37	67.4	III (Low Priority)
Q1	2.60	3.30	78.8	IV (Overkill)
Q2	2.17	3.33	65.2	III (Low Priority)
Grand Mean	2.32	3.55	65.3%	-

These grand-mean values also provide an empirical check on the ceiling-effect concern raised in Section I [7]. All 14 importance ratings ($\bar{Y}_i$ range 3.30–3.77) exceeded the fixed scale midpoint of 3.00, a pattern consistent with the well-documented tendency for importance ratings to compress toward the upper end of the scale. Had a fixed midpoint threshold been applied instead of the grand mean ($\bar{Y} = 3.55$), every attribute would have been classified as high-importance, collapsing Quadrants III and IV and eliminating the method's discriminative capacity on the importance axis. Conversely, all 14 performance ratings ($\bar{X}_i$ range 1.73–2.97) remained below the midpoint, indicating no equivalent risk of ceiling-effect bias on the performance axis for this dataset. This asymmetry confirms that the grand-mean-anchoring approach specified in Section II was not merely a procedural default but a substantively necessary safeguard: it preserved meaningful quadrant differentiation on the importance axis that a midpoint-based threshold would have erased.

Quadrant Analysis and Strategic Implications

Four attributes were positioned in **Quadrant I**, representing the most urgent targets for improvement:

1. I4 (Internship information): Tki = 47.3%, the lowest conformity in the study. Importance score of 3.67 contrasts sharply with performance of 1.73, reflecting the complete absence of a dedicated internship page in the existing website. For

engineering students, internship access represents a critical career development resource, making this omission particularly impactful on user satisfaction.

2. I7 (Current engineering articles): Tki = 56.4%. Users place high value on access to contemporary technical knowledge through the faculty platform (importance = 3.67), yet the blog section was minimally curated (performance = 2.07), offering neither regular updates nor organized categorization.
3. I5 (Job vacancy information for alumni): Tki = 56.3%. Despite the high importance rating (3.73), this feature was entirely absent from the existing website, representing a structural gap in post-graduation support services that negatively affects alumni engagement and institutional loyalty.
4. U3 (Visual design reflecting institutional identity): Tki = 57.1%. The visual aesthetic of the existing website was evaluated as significantly below user expectations, with the default sans-serif typography, high-contrast color scheme, and cluttered banner design collectively undermining the faculty's professional image.

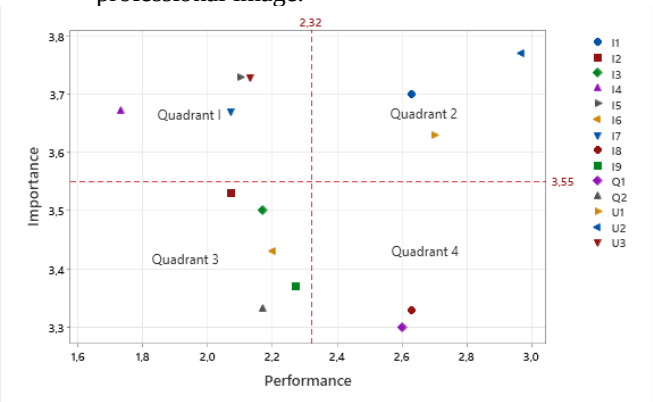

Figure 1. IPA Diagram

Three attributes attained **Quadrant II** positioning, representing current strengths to be maintained:

1. U1 (Layout clarity): Tki = 74.4%, performance = 2.70, importance = 3.63. Users found the page layout generally comprehensible, though the conformity below 100% suggests room for further refinement.
2. U2 (Navigation menu): Tki = 78.8%, the highest conformity across all items. Navigation was the strongest-performing attribute, though with performance at 2.97 (below the midpoint of 5), even this 'strength' reflects modest absolute quality.
3. I1 (Understandable language): Tki = 71.1%. Content language was generally accessible to users.

Five attributes (I2, I3, I6, I9, Q2) in **Quadrant III** exhibited both low performance and below-mean importance, suggesting that while improvements would be welcomed, they do not represent immediate strategic priorities. Two attributes (I8, Q1) in **Quadrant IV** showed relatively high performance despite below-mean importance, indicating possible over-investment. Administrative form access (Q1, Tki = 78.8%) and student organization information (I8, Tki = 79.0%) appear adequately resourced; capacity might be redirected toward Quadrant I deficiencies.

Website Redesign: IPA-Informed Design Development

The IPA findings directly informed the development of three alternative design concepts for the faculty website. The redesign addressed Quadrant I priorities while preserving and extending Quadrant II strengths. The following sections describe the key design decisions and their IPA rationale.

The redesigned website adopts a modular, card-based information architecture inspired by contemporary academic web design standards. The homepage presents segmented content zones — Faculty Profile, University Context, News & Announcements, and Partner Organizations — each clearly delineated to support cognitive chunking and reduce navigation load [19]. Poppins, a geometric sans-serif typeface designed for screen readability, replaces the default Arial-equivalent typography of the existing site, establishing a consistent, professional visual identity aligned with engineering faculty branding conventions.

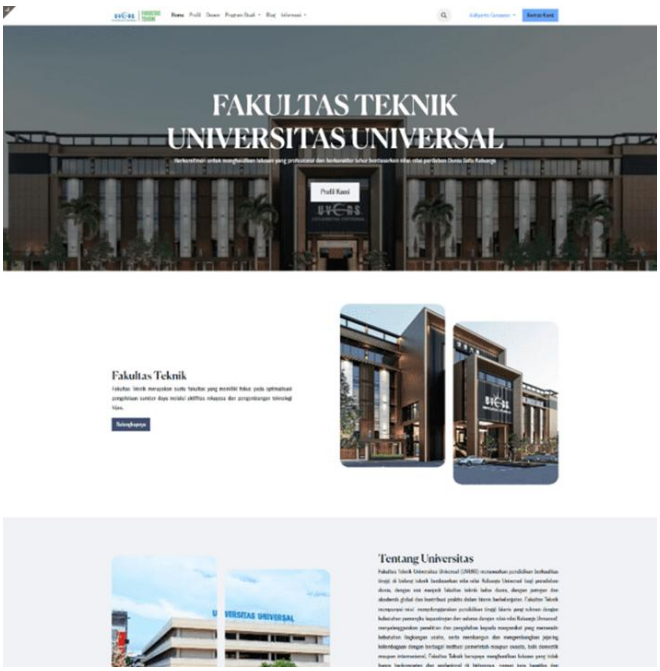

Figure 2. Alternative Homepage Design for the Website

The jumbotron (hero section) was redesigned to prioritize institutional messaging with a single, focused call-to-action, eliminating the visual competition from multiple promotional banners that fragmented user attention in the original design. Color architecture shifted from the original high-contrast green-dominant scheme to a blue-white palette consistent with engineering and technology sector conventions, reinforcing institutional identity (U3 improvement rationale).

The internship page directly addresses the I4 gap by providing a structured listing of internship opportunities

presented in uniform visual cards, each displaying position title, company name, location, registration deadline, and a direct application link. This card-based format was chosen for its established effectiveness in reducing information search time in job-seeking contexts [20]. The page is prominently accessible from the main navigation menu.

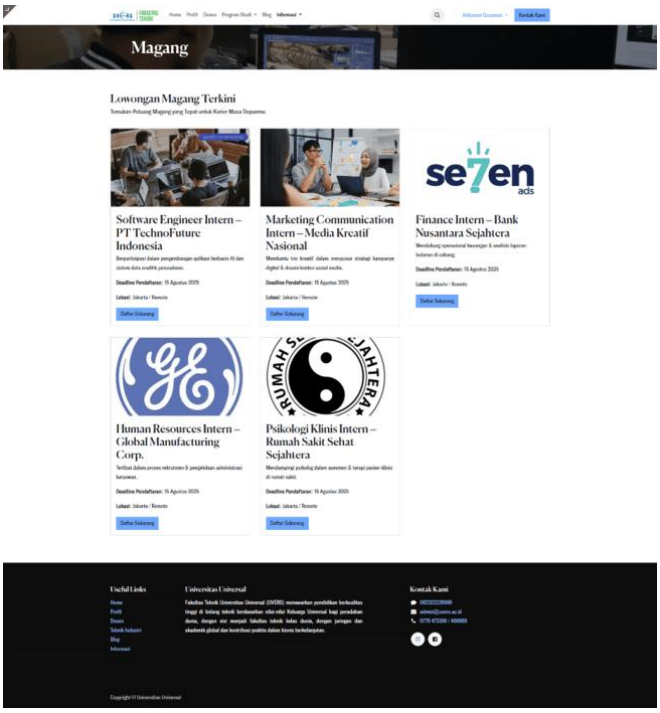

Figure 3. Internship Information Page

The job vacancy page mirrors the internship page architecture to address the I5 gap, targeting alumni as the primary user segment. By providing career development resources directly through the institutional website, this feature strengthens alumni-institution ties and transforms the website from a purely current-student resource into a lifelong learning and career support platform.

The blog section was restructured to address I7, with content categorized into 'Articles' (technical/academic) and 'News' (faculty/institutional), each displayed in searchable, visually distinct card formats with publication dates, category tags, and thumbnail images. This restructuring supports regular content curation and discoverability, addressing both currency and diversity deficits identified in Quadrant III attributes (I2, I3).

The Faculty Profile page was redesigned with improved visual hierarchy — alternating blue-black content blocks with generous white space — maintaining navigation clarity (U2) and language accessibility (I1) while substantially elevating visual quality. The Lecturer Directory page adopted a card-based format emphasizing academic profile essentials (name, title, academic social links) while reducing visual clutter compared to the previous version featuring large multi-colored external platform icons. The Contact page integrated an interactive submission form alongside static contact information, increasing service interaction quality beyond the purely static presentation of the original.

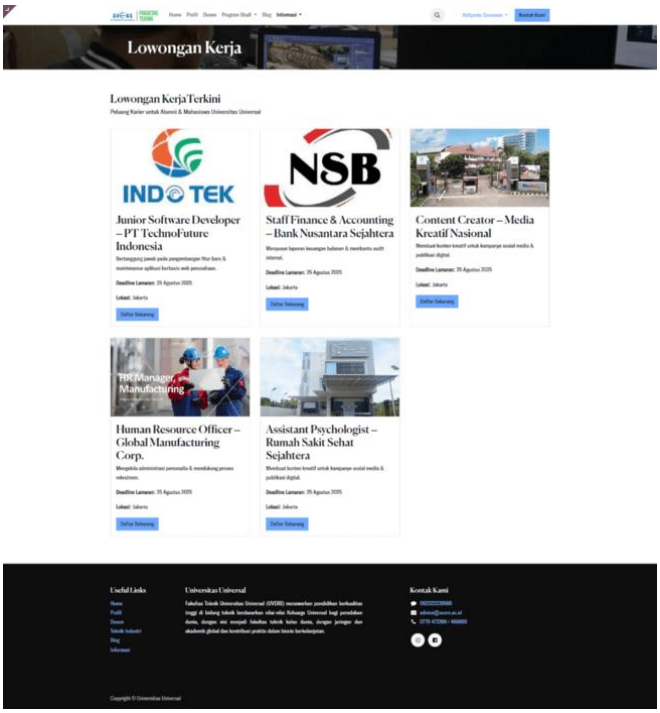

Figure 4. Job Vacancy Information Page

The 65.3% overall conformity level documented in this study is consistent with findings from analogous Indonesian higher education website evaluations. [13] reported similarly dominant Quadrant I positioning for information quality attributes in their multi-faculty study, while [11] identified information currency as the primary performance deficit in an e-learning context. The specific pattern observed here — where career development information (internship and job vacancy) emerges as the most critically underserved need — reflects the evolving expectations of Gen-Z university users who increasingly view institutional digital platforms as integrated career development tools rather than pure information repositories.

The complete absence of internship and job vacancy pages in the original website (Tki = 47.3% and 56.3% respectively) represents a systemic design oversight that extends beyond simple content management failure. It suggests that the original website was designed without formal user requirement analysis, relying instead on conventional academic website templates that prioritize administrative and academic information over career development support. This finding has implications beyond UVERS: Indonesian higher education institutions broadly may be underestimating the career-orientation of their student and alumni website user base.

The paradox of Quadrant II positioning for navigation and layout (U1, U2) despite absolute performance scores well below the Likert midpoint deserves acknowledgment. The relatively high ranking of these attributes reflects user

expectations calibrated to the generally low baseline of Indonesian academic websites rather than international benchmarks. This suggests that absolute performance improvements in navigation and layout — achievable through the redesign — would generate satisfaction gains beyond what the IPA quadrant positioning alone implies.

The design intervention philosophy adopted here — using IPA findings to explicitly specify functional page requirements rather than relying on designer intuition — represents a methodological contribution to the practitioner literature. Conventional website redesign projects in academic contexts typically begin with aesthetic inspiration and then overlay informational structure; this study inverts that sequence, beginning with empirically identified user needs and deriving design specifications from them. This evidence-to-design pipeline, documented here for replication, aligns with best practices in user-centered design ISO 9241-210 [21].

IV. CONCLUSION

This study demonstrates the utility of IPA-WebQual 4.0 integration as an evaluation framework for academic faculty websites. The empirical evaluation of the UVERS Engineering Faculty website revealed a significant performance-expectation gap (Tki = 65.3%), with four attributes identified as immediate improvement priorities: internship opportunity information, job vacancy information for alumni, current engineering articles, and visual design quality. These findings directly informed the development of alternative website designs that introduce new functional pages (internship listings, job vacancies, restructured blog), enhanced visual identity through Poppins typography and institutional color architecture, and improved page-level information hierarchy throughout.

From a methodological perspective, this study establishes a comprehensive workflow ranging from evaluation to redesign, encompassing the IPA-WebQual survey, quadrant analysis, functional requirement specifications, and prototype design implementation. This workflow can be directly applied by practitioners and researchers evaluating academic or other public sector websites. The validated instrument, consisting of 14 items adapted from WebQual 4.0, provides a ready-to-use measurement tool for similar research. Collectively, these contributions close the four gaps identified in Section I: concrete design interventions were derived from IPA findings (Gap 1), Quadrant I attributes were systematically mapped to functional page specifications (Gap 2), modern UI/UX principles were formally documented as design solutions (Gap 3), and quadrant boundaries were anchored in the grand mean — rather than a fixed scale midpoint — and empirically verified against this study's own data to guard against ceiling-effect bias (Gap 4).

Several limitations warrant acknowledgment. The sample size of 30, while meeting IPA minimum requirements, limits the generalizability of findings beyond the UVERS Engineering Faculty context. Furthermore, the uneven distribution across stakeholder subgroups — particularly the single administrative staff respondent — limits the extent to which the grand mean can be interpreted as equally representative across all user types; the aggregate scores are more accurately characterized as reflecting predominantly the perceptions of the student subgroup, which constituted 60% of the sample. The absence of post-redesign usability testing prevents empirical verification that the proposed designs achieve the intended user experience improvements. Future research should conduct usability testing of the proposed designs with representative user panels; apply the same IPA-WebQual framework longitudinally to assess improvement trajectories; employ stratified sampling with minimum quotas per stakeholder subgroup to ensure balanced representation; and extend the study to a multi-faculty comparative design to identify institution-level versus faculty-specific quality patterns.

REFERENCES

[1] D. Al-Fraihat, M. Joy, R. Masa'deh, and J. Sinclair, "Evaluating E-learning systems success: An empirical study," *Comput. Human Behav.*, vol. 102, pp. 67–86, 2020, doi: 10.1016/j.chb.2019.08.004.

[2] L. M. C. Benavides, J. A. Tamayo Arias, M. D. Arango Serna, J. W. Branch Bedoya, and D. Burgos, "Digital transformation in higher education institutions: A systematic literature review," *Sensors*, vol. 20, no. 11, p. 3291, 2020, doi: 10.3390/s20113291.

[3] I. Santiko, H. D. Bastyan, and N. I. Dewi Cantika, "Utilizing the Importance Performance Analysis Model, an Examination of Search Engine Performance Measurement on College Websites And Its Impact on Prospective Students' Interest," in *2025 9th International Conference on Information Technology, Information Systems and Electrical Engineering (ICITISEE)*, 2025, pp. 7–12. doi: 10.1109/ICITISEE68184.2025.11355107.

[4] A. G. M. Putra and D. Yulianto, "New Student Admission Website Evaluation Using WebQual 4.0 and Importance-Performance Analysis," *J. Nas. Tek. Elektro dan Teknol. Inf.*, vol. 11, no. 3, pp. 161–167, 2022, doi: 10.22146/jnteti.v11i3.3522.

[5] H. Faqih, Warjiyono, F. Kuhon, S. Aji, A. Ardiansyah, and Fandhilah, "An analysis and measurement of website quality using WebQual 4.0 and importance performance analysis (IPA) method (a case study of Kemiriamba Village Brebes)," in *Journal of Physics: Conference Series*, IOP Publishing, 2020, p. 12096, doi: 10.1088/1742-6596/1641/1/012096.

[6] J. A. Martilla and J. C. James, "Importance-performance analysis," *J. Mark.*, vol. 41, no. 1, pp. 77–79, 1977, doi: 10.1177/002224297704100112.

[7] H. Oh, "Revisiting importance-performance analysis," *Tourism Manag.*, vol. 22, no. 6, pp. 617–627, 2001, doi: 10.1016/S0261-5177(01)00036-X.

[8] S. J. Barnes and R. T. Vidgen, "An integrative approach to the assessment of e-commerce quality.," *J. Electron. Commer. Res.*, vol. 3, no. 3, pp. 114–127, 2002.

[9] Q. E. Muftikhali, D. Satria, and E. N. Jamilah, "Measuring the Quality of Higher Education Website using Webqual Method and Importance-Performance Analysis," *Sist. J. Sist. Inf.*, vol. 13, no. 3, pp. 991–999, 2024, doi: 10.32520/stmsi.v13i3.3666.

[10] A. Wilson, V. Zeithaml, M. J. Bitner, and D. Gremler, *EBOOK: Services Marketing: Integrating customer focus across the firm*. McGraw Hill, 2016.

[11] D. H. Pamungkas and S. Subhan, "Quality Analysis of E-Learning Website (Elena) Using Webqual 4.0 Method and Importance Performance Analysis (IPA)," *J. Adv. Inf. Syst. Technol.*, vol. 5, no. 2, pp. 168–179, 2023, doi: 10.15294/jaist.v5i2.68168.

[12] J. Zeqiri, T. R. Dania, L. T. D. Adriana, K. Gagica, and K. Gleason,

"The impact of e-service quality on word of mouth: A higher education context," *Int. J. Manag. Educ.*, vol. 21, no. 3, p. 100850, 2023, doi: 10.1016/j.ijme.2023.100850.

[13] L. Maryana, R. Komaladewi, A. Mulyana, and K. Saefullah, "Importance Performance Analysis (IPA) on Website Quality (Webqual): An evidence from a higher education institution in Indonesia," *Adv. Soc. Sci. Res. J*, vol. 9, no. 2, pp. 1–7, 2022, doi: 10.14738/assrj.92.11696.

[14] M. L. Hamzah, R. F. Rahmadhani, and A. A. Purwati, "An integration of Webqual 4.0, importance performance analysis and customer satisfaction index on E-campus," *J. Syst. Manag. Sci.*, vol. 12, no. 3, pp. 25–50, 2022, doi: 10.33168/JSMS.2022.0302.

[15] N. Wisudawati, M. G. Irfani, M. Hastarina, and B. Santoso, "Penggunaan Metode Importance-Performance Analysis (IPA) Untuk Menganalisis Kepuasan Masyarakat Terhadap Pelayanan Administrasi Kependudukan Kecamatan Lengkiti," *Integr. J. Ilm. Tek. Ind.*, vol. 8, no. 1, pp. 32–39, 2023.

[16] J. W. Creswell and V. L. P. Clark, *Designing and conducting mixed methods research*. Sage publications, 2017.

[17] C.-H. Wu, P.-L. Kuo, C.-H. Yang, Y.-C. Chang, and T.-L. Chen, "Importance–performance analysis (IPA) in analyzing the satisfaction of administrative support in teaching practice research programs," *Sustainability*, vol. 15, no. 3, p. 1943, 2023, doi: 10.3390/su15031943.

[18] J. C. Nunnally, "Psychometric theory—25 years ago and now," *Educ. Res.*, vol. 4, no. 10, pp. 7–21, 1975, doi: 10.3102/0013189X004010007.

[19] J. Nielsen, *Usability engineering*. Morgan Kaufmann, 1994.

[20] E. A. J. Van Hooft, G. Van Hoye, and S. M. Van Den Hee, "How to Optimize the Job Search Process : Development and Validation of the Job Search Quality Scale," vol. 30, no. 3, pp. 474–505, 2022, doi: 10.1177/10690727211052812.

[21] F. Tosi, "From user-centred design to human-centred design and the user experience," in *Design for ergonomics*, Springer, 2019, pp. 47–59, doi: 10.1007/978-3-030-33562-5_3.