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Developing a Digital Competence Framework for Higher Education Administrative Staff and Academic Service Quality

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ABSTRACT

Digital transformation in higher education depends on administrative staff who manage academic information, student services, records, communication, and institutional processes. However, their digital competence is often defined only as the ability to operate applications, while data quality, digital communication, cybersecurity, accessibility, process improvement, and artificial intelligence receive less attention. This study developed a role-specific digital competence framework for higher education administrative staff and linked it to academic service quality. A structured integrative review synthesized 21 peer-reviewed publications and four official competence or policy documents published mainly between 2018 and 2025. Sources were selected for relevance, verifiable publication details, clear methods or institutional authority, and direct contribution to the research questions. Data were extracted and compared through thematic analysis. Seven competence dimensions were identified: technical and platform skills, information and data literacy, digital communication and collaboration, digital safety and data protection, problem solving and process improvement, user-centred and accessible service, and artificial intelligence literacy with human oversight. The review also found that leadership, system usability, role clarity, data governance, and workplace-based training determine whether competence improves service. The proposed framework connects competence with reliable, responsive, secure, efficient, accessible, and transparent academic services. It provides a practical basis for staff development and service evaluation, but its relationships require empirical testing in different institutional settings.
Keywords: academic service quality, administrative staff, digital competence, higher education, service improvement

ABSTRAK

Transformasi digital pendidikan tinggi bergantung pada tenaga kependidikan yang mengelola informasi akademik, layanan mahasiswa, dokumen, komunikasi, dan proses kelembagaan. Namun, kompetensi digital mereka sering hanya dipahami sebagai kemampuan mengoperasikan aplikasi, sedangkan kualitas data, komunikasi digital, keamanan siber, aksesibilitas, perbaikan proses, dan kecerdasan buatan kurang mendapat perhatian. Penelitian ini mengembangkan kerangka kompetensi digital yang sesuai dengan tugas tenaga kependidikan dan menghubungkannya dengan kualitas layanan akademik. Kajian integratif terstruktur dilakukan terhadap 21 publikasi ilmiah dan empat dokumen resmi tentang kompetensi atau kebijakan yang terutama diterbitkan pada 2018-2025. Sumber dipilih berdasarkan relevansi, keterlacakan identitas publikasi, kejelasan metode atau kewenangan kelembagaan, serta kontribusinya terhadap pertanyaan penelitian. Data diekstraksi, dibandingkan, dan dianalisis secara tematik. Hasil kajian mengidentifikasi tujuh dimensi kompetensi: keterampilan teknis dan platform, literasi informasi dan data, komunikasi dan kolaborasi digital, keamanan digital dan perlindungan data, pemecahan masalah dan perbaikan proses, layanan yang berpusat pada pengguna dan mudah diakses, serta literasi kecerdasan buatan dengan pengawasan manusia. Kajian juga menunjukkan bahwa kepemimpinan, kemudahan penggunaan sistem, kejelasan peran, tata kelola data, dan pelatihan berbasis pekerjaan menentukan penerapan kompetensi dalam layanan. Kerangka yang dihasilkan menghubungkan kompetensi dengan layanan akademik yang andal, responsif, aman, efisien, mudah diakses, dan transparan. Hubungan dalam kerangka tersebut masih perlu diuji secara empiris pada berbagai konteks perguruan tinggi.
Kata kunci: *kompetensi digital, kualitas layanan akademik, pendidikan tinggi, perbaikan layanan, tenaga kependidikan*

1. INTRODUCTION

Digital transformation in higher education is not limited to teaching and learning. It also changes registration, curriculum administration, timetabling, academic records, student support, document management, quality assurance, and institutional reporting. Administrative staff work at the point where information systems, academic rules, students, lecturers, and institutional leaders meet. Their competence affects whether digital systems produce accurate and timely services or simply move inefficient manual procedures onto electronic platforms.

Digital competence is broader than routine application use. Reviews of higher education research describe it as a combination of technical, informational, communicative, critical, ethical, and problem-solving abilities [1], [2]. Assessments based only on confidence or frequency of device use may not reflect actual performance [3]. DigComp 2.2 groups digital competence into information and data literacy, communication and collaboration, digital content creation, safety, and problem solving [4]. UNESCO guidance also places digital competence within professional development, institutional policy, and system planning [5], [6]. These sources provide a strong foundation, but they do not fully describe the specific responsibilities of higher education administrative staff.

Research on digital competence in higher education has focused mainly on students and academic staff [7]-[9]. Administrative staff have received less attention even though they manage personal data, interpret academic rules, coordinate workflows, respond to service requests, and maintain institutional records. A study of administrative staff in Turkish universities found that digital literacy supported technology acceptance through perceived ease of use and performance expectations [10]. Indonesian research reported associations between digital competence, task autonomy, employee agility, training, and staff performance [11], [12]. A study of public university employees in Brazil also showed that digital infrastructure, integration, and management were related to digital competence and innovative work behaviour [13].

Artificial intelligence expands these responsibilities. Administrative staff may use chatbots, text-generation systems, document classification, data analysis, or automated routing. Useful application requires more than producing prompts. Staff must verify outputs, protect confidential data, recognise unsuitable uses, document decisions, and refer high-risk cases to authorised personnel. A qualitative study of higher education administrative staff identified data literacy, human-AI collaboration, validation, continuous learning, and institutional accountability as important competencies [14]. A review of digital technology in university administration similarly identified efficiency opportunities alongside privacy, infrastructure, and readiness concerns [15].

Academic service quality offers a practical basis for judging whether competence has institutional value. Higher education service-quality studies commonly examine reliability, responsiveness, assurance, empathy, access, and user experience [16]-[21]. Administrative efficiency can also be measured through cycle time, error rates, repeated work, delays, and stakeholder satisfaction [22], [23]. Digital competence should therefore be evaluated through the quality of the work and services that staff can produce, not only through self-reported ability.

The existing literature provides useful but separate insights on digital competence, university administration, service quality, process improvement, and artificial intelligence. A role-specific framework that connects these areas remains limited. This study therefore addressed four questions: (1) Which dimensions of digital competence are most relevant to higher education administrative staff? (2) How can these competencies support academic service quality? (3) Which institutional conditions support or hinder their use? and (4) How can the framework guide staff development and service evaluation? The study aimed to develop an integrated and testable framework without claiming that the proposed relationships have already been confirmed through field research.

2. METHOD

2.1. Review Design

The study used a structured integrative review. This design was selected because the research questions required the combination of quantitative studies, qualitative studies, literature reviews, competence frameworks, and policy documents. Integrative reviews are appropriate when evidence from different methods must be compared and combined to develop a clearer conceptual understanding [24], [25]. The purpose was framework development, not estimation of a pooled effect. The review therefore did not conduct meta-analysis and did not claim exhaustive coverage equivalent to a registered systematic review.

2.2. Search and Selection of Sources

The literature search was updated on 23 July 2026. Searches used Crossref, ERIC, the Directory of Open Access Journals, publisher platforms, Indonesian journal portals, and backward reference checking. Search terms combined digital competence, digital literacy, administrative staff, non-academic staff, higher education administration, academic service quality, administrative efficiency, digital training, data literacy, artificial intelligence, and technology acceptance. The main publication period was 2018-2025, earlier sources were retained only when needed for an established review method or framework.

Sources were included when they had a verifiable DOI, publisher record, or official document identifier, addressed higher education administration, digital competence, service quality, process improvement, or a framework that could reasonably be applied to administrative staff, and reported a clear research method or official institutional basis. Opinion pieces, promotional materials, school-only studies without a clear higher education connection, and technology papers without an administrative or service component were excluded. The final substantive corpus contained 21 peer-reviewed

publications and four official competence or policy documents. Two additional publications were used only to guide the review method.

Table 1. Source Selection Criteria

Dimension	Included	Excluded
Source type	Peer-reviewed empirical study, review, or official competence/policy document	Opinion, promotional content, or source without a clear method or authority
Context	Higher education administration or evidence relevant to administrative work	School-only or unrelated workplace context without a defensible link
Topic	Digital competence, administration, service quality, process improvement, AI, or technology use	Technical system study without human, organisational, or service implications
Period	Mainly 2018-2025, earlier sources only for established methods or frameworks	Older material replaced by a current authoritative source
Traceability	DOI, official publisher page, or official document identifier	Unverifiable title, author, publication, or document origin

Note. The search was structured and documented but purposive, the study does not claim exhaustive database coverage.

2.3. Data Extraction and Source Evaluation

A structured matrix recorded the objective, context, participants or documentary basis, research design, competence concepts, organisational conditions, service outcomes, and limitations of each source. Sources were evaluated using four criteria: verifiable publication identity, clear method or institutional authority, relevance to at least one research question, and sufficient detail to support interpretation. Evidence from studies directly involving higher education administrative staff received the greatest weight. Studies of academic staff, students, service quality, or public administration were used as supporting evidence and were not presented as direct tests of administrative-staff competence.

2.4. Thematic Analysis and Framework Development

Analysis followed four steps. First, statements about skills, work behaviours, organisational conditions, and service outcomes were coded. Second, similar codes were grouped into competence dimensions and service-quality categories. Third, the relationships between competence, workplace application, institutional conditions, and service outcomes were compared across sources. Fourth, the emerging framework was checked against DigComp 2.2, UNESCO guidance, higher education digital-competence research, and service-quality models. Relationships that were not directly tested were stated as proposed links for future research rather than confirmed causal effects.

2.5. Ethical Considerations

The study used published research and publicly available official documents. It did not collect personal data or involve human participants. Ethical approval was therefore not required. Care was taken to distinguish reported findings from the interpretation developed in this review.

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Characteristics of the Evidence Base

The evidence base contained three types of sources. Direct evidence examined administrative staff or public university employees and addressed technology acceptance, work agility, training, innovative work behaviour, AI-related competence, and internal service quality. Supporting evidence examined higher education service quality, administrative efficiency, process improvement, and digital competence among academic staff or public-administration learners. Official documents supplied general competence categories and institutional guidance. This combination allowed the framework to be grounded in direct research while using broader evidence only where it clarified service outcomes or organisational conditions.

The most directly relevant studies are summarised in Table 2. Their results consistently show that digital competence does not operate alone. System usefulness, task autonomy, digital management, workplace training, and organisational support influence whether competence is used in daily work. The studies also focus on different outcomes, so they do not establish one complete pathway from competence to academic service quality.

Table 2. Direct Evidence Most Relevant to Higher Education Administrative Staff

Source	Context / sample	Design	Contribution to the review
Kabakus et al. [10]	Türkiye, 158 administrative staff	Structural equation modelling	Digital literacy supported technology acceptance through perceived ease and performance expectations.
Nuha and Pahlevi [11]	Indonesia, 146 administrative staff	PLS-SEM	Digital competence was associated with task autonomy and employee agility.
de Carvalho et al. [13]	Brazil, 181 public university employees	PLS-SEM	Digital infrastructure, integration, and management were linked to competence and innovative work behaviour.
Sarifudin et al. [12]	Indonesia, 160 administrative staff	PLS-SEM	Digital training was associated with competence and staff performance.
Hidayati [14]	Indonesia, administrative staff	Qualitative study	Data literacy, output verification, human-AI collaboration, and continuous learning were central themes.
Skarpeta et al. [21]	Greek public universities, administrative staff	Survey	Internal service quality was multidimensional and should be assessed from employees' work context.

3.1.2. Dimensions of Digital Competence

Seven dimensions were identified (Table 3). The first five adapt established digital-competence categories to administrative work. The final two respond to the service role of administrative staff and the growing use of artificial intelligence. The dimensions are related but should not be treated as interchangeable. A staff member may operate a platform successfully while lacking the ability to check data quality, protect personal information, explain a digital process to users, or verify an AI-generated response.

Technical and platform skills cover reliable use of the systems needed to complete work. Information and data literacy concerns the quality, interpretation, and traceability of academic records. Digital communication and collaboration involve clear messages and coordination across units. Digital safety and data protection address secure access and responsible handling of information. Problem solving and process improvement focus on finding causes of errors and reducing unnecessary steps. User-centred and accessible service extends competence to respectful, understandable, and inclusive interaction. AI literacy and human oversight require staff to select appropriate uses, verify output, protect data, and preserve accountability.

Table 3. Digital Competence Dimensions for Higher Education Administrative Staff

Dimension	Expected work behaviour	Illustrative performance indicators
1. Technical and platform skills	Use academic information systems, document systems, collaboration tools, and routine service applications, perform basic troubleshooting.	Transaction completion, time required, continuity during routine problems, appropriate escalation.
2. Information and data literacy	Search, check, clean, document, interpret, and communicate academic data.	Accuracy, duplicate records, completeness, reporting quality, traceable corrections.
3. Digital communication and collaboration	Choose suitable channels, write clear service messages, coordinate work across units, and manage digital communication.	Response time, clarity, cross-unit resolution, fewer repeated enquiries.
4. Digital safety and data protection	Use secure authentication, manage access rights, protect personal data, recognise phishing, and report incidents.	Access violations, security incidents, compliance, recovery, audit records.
5. Problem solving and process improvement	Identify the source of a problem, map workflows, reduce repeated work, and improve links between systems and units.	Cycle time, rework, delays, first-contact resolution, process reliability.
6. User-centred and accessible service	Provide respectful and understandable assistance, consider different user needs, and offer accessible service channels.	User satisfaction, accessibility, complaint recurrence, successful support for users needing assistance.
7. AI literacy and human oversight	Select appropriate AI uses, verify outputs, protect data, document decisions, and refer high-risk cases.	Verified outputs, error detection, escalation records, transparency, documented human review.

3.1.3. Conditions for Applying Competence

Five institutional conditions repeatedly shaped the use of competence. First, systems must be usable and sufficiently integrated. Training cannot permanently compensate for fragmented platforms or repeated data entry. Second, leadership must define priorities, roles, and accountability. Third, data governance must specify legitimate access, security duties, retention, and correction procedures. Fourth, staff need task-appropriate authority to resolve routine cases while referring exceptions. Fifth, training must use actual work tasks and be followed by practice, feedback, and monitoring.

The review therefore treats digital competence as a combination of individual capability and a work environment that enables its responsible use. This distinction is important for evaluation. A service failure may result from limited staff competence, but it may also result from an unreliable system, an unclear procedure, conflicting rules, or insufficient authority. Improvement decisions should identify the cause before assigning additional training.

Table 4. Proposed Pathways from Digital Competence to Academic Service Quality

Pathway	Interpretation based on the reviewed studies	Expected service contribution
Technology acceptance	Competence can reduce difficulty and increase confidence in the usefulness of official systems [10].	More consistent system use and fewer parallel manual records.
Work agility and appropriate autonomy	Competent staff can adapt to system or procedure changes when roles and decision limits are clear [11].	Faster response, continuity during change, and better routine problem solving.
System integration and digital management	Usable systems, infrastructure, and management support enable staff to apply competence across units [13].	Fewer duplicate entries, better coordination, and more reliable reporting.
Training transfer	Training contributes to performance when it uses actual work tasks and includes workplace support [12].	Lower error rates and sustained application after training.
Process improvement	Data and problem-solving competence help identify delays, repeated work, and inefficient procedures [22], [23].	Shorter service time, less rework, and more predictable processes.
Human oversight of AI	Verification and clear accountability prevent automated output from becoming an unreviewed decision [14], [15].	Better accuracy, privacy, transparency, and handling of exceptional cases.

3.1.4. Integrated Framework

The proposed framework links four elements: role-specific competence, institutional conditions, application in work, and academic service quality (Figure 1). Competence supports service only when staff can apply it through consistent system use, accurate data handling, clear communication, process improvement, adaptation, and verification of AI outputs. Institutional conditions influence every stage. Service results then provide feedback for further competence development, system improvement, or process redesign.

The expected service outcomes are reliability, responsiveness, security, efficiency, accessibility, transparency, and better user experience. These outcomes are consistent with higher education service-quality research [16]-[21], but the full model has not been tested in a single empirical study. It should therefore be used as a structured proposal for future testing and institutional planning, not as proof of a causal relationship.

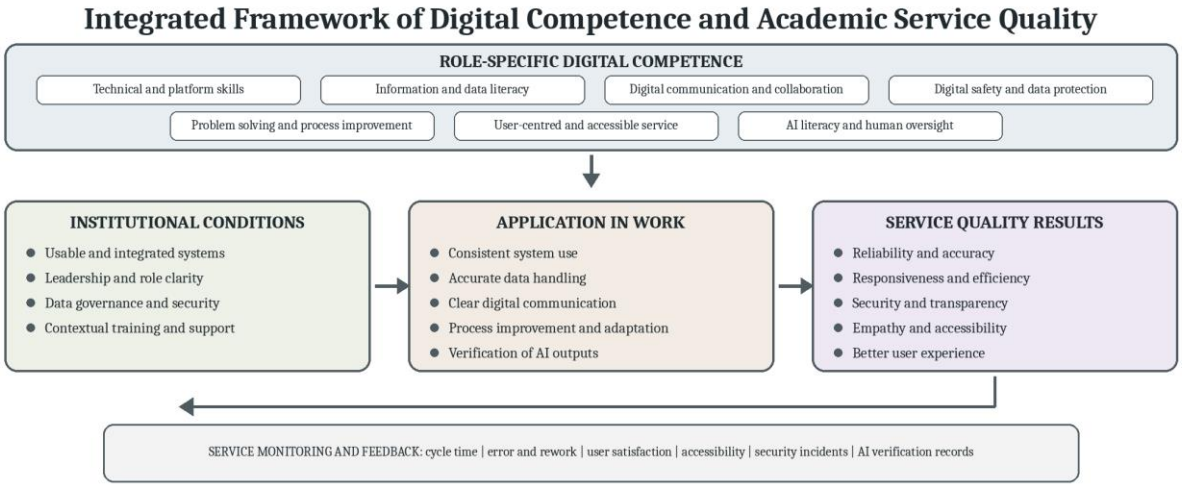


Figure 1. Integrated Framework of Digital Competence and Academic Service Quality

3.2. Discussion

3.2.1. Role-Specific Competence and Service Quality

The main finding is that higher education administrative staff require job-specific digital competence rather than general application familiarity. Digital transformation changes how records are created, checked, shared, and used in decisions. It also changes how staff communicate with students and coordinate with other units. A general competence score may hide important differences between technical ability, data quality, security, service communication, and process improvement.

The framework also clarifies the connection with academic service quality. Technical skill is most likely to support transaction reliability and completion time. Data literacy supports accurate records and reports. Digital communication and user-centred service support responsiveness and clarity. Security competence supports assurance and trust. Problem solving supports efficiency and process reliability. AI literacy becomes important when automated tools contribute to documents, recommendations, or service responses. This differentiated mapping is more useful for staff development than a single undivided training programme.

3.2.2. Artificial Intelligence and Human Responsibility

Artificial intelligence should be treated as an additional area of responsibility, not as a replacement for established competence. Staff need to know when AI is suitable, what information must not be entered, how to check an answer, and who remains responsible for the final decision. Human review should be strongest in admissions, scholarships, complaints, identity verification, academic status, and other decisions that affect rights or access. Low-risk uses, such as drafting a non-confidential internal summary, may require a lighter review process but should still follow institutional rules.

3.2.3. Implications for Staff Development and Evaluation

For institutional practice, the framework supports a six-stage development cycle (Table 5). The cycle begins with diagnosis because different units require different competence. Registration staff may need document verification and user communication, data officers may need data quality and reporting, information-technology staff may need security and reliability, and managers may need data governance and AI oversight. Training should therefore be linked to actual roles and service problems. Practice-oriented public-administration education also supports the value of targeted digital training [26]. For UIN Siber Syekh Nurjati Cirebon, this need is especially relevant because its establishment places technology-based higher education at the centre of the institutional mandate [27], however, the present review does not assess the competence of its staff.

Assessment should combine self-report with demonstrations, work samples, supervisor review, and service data. Self-report can identify confidence and perceived need, but it cannot confirm accurate performance. Useful indicators include completion time, error and rework rates, complaint recurrence, accessibility, security incidents, and records showing that AI outputs were checked. These measures allow institutions to determine whether training produces a visible improvement in work and service.

Table 5. Six-Stage Development and Evaluation Cycle

Stage	Main activities	Expected evidence
1. Diagnose	Map roles, systems, tasks, service problems, and data or AI risks.	Role-based competence profile, baseline error, time, satisfaction, accessibility, and security data.
2. Prioritise	Select gaps with the greatest service or risk consequences.	Annual priorities linked to academic-service needs and institutional risk.
3. Train in context	Use the systems, documents, cases, and decisions handled by each unit.	Improved performance on authentic tasks rather than attendance alone.

Stage	Main activities	Expected evidence
4. Practise with support	Provide coaching, peer support, safe practice environments, and review of real cases.	Fewer avoidable errors and stronger transfer to daily work.
5. Assess performance	Use demonstrations and work samples at basic, operational, analytical, and AI-oversight levels.	Competence decisions based on demonstrated performance.
6. Monitor services	Track service time, accuracy, rework, accessibility, user feedback, security, and AI review records.	Evidence for continued training, system improvement, and process redesign.

3.2.4. Limitations and Future Research

The study has limitations. The literature directly focused on higher education administrative staff is still limited. The search was structured and documented but purposive rather than exhaustive. The reviewed sources used different populations, constructs, and outcomes, which prevented statistical combination. Several links in the framework were developed by connecting direct administrative-staff research with supporting service-quality and process-improvement studies. Future research should test the framework with multi-source data, role-based performance tasks, service records, and comparisons across different types of higher education institutions.

4. CONCLUSION

Higher education administrative staff need digital competence that goes beyond operating applications. The integrative review identified seven dimensions: technical and platform skills, information and data literacy, digital communication and collaboration, digital safety and data protection, problem solving and process improvement, user-centred and accessible service, and AI literacy with human oversight.

These competencies can support academic service quality when institutions provide usable systems, clear roles, sound data governance, appropriate authority, and workplace-based training. The proposed framework connects competence with reliable, responsive, secure, efficient, accessible, and transparent services and provides a practical cycle for diagnosis, training, assessment, and service monitoring. Because the complete framework has not yet been tested in the field, its relationships should be examined through future empirical studies rather than treated as confirmed effects.

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