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Digital Transformation for Data-Driven Management and Training in Open Higher Education: A Case-Based Framework

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Abstract

Digital transformation in higher education is no longer limited to the digitisation of documents or the adoption of isolated learning-management tools. It requires redesigning governance, teaching, learning support and quality assurance around integrated platforms, reusable digital learning resources and actionable data. This article develops a case-based framework for applying technology in the management and delivery of open and distance higher education. Drawing on document analysis, policy review, SWOT analysis and a five-level digital maturity model, the study identifies a gap between the availability of basic digital tools and the capability to operate an integrated, evidence-based digital education ecosystem. The findings show that the institution under study has early experience with learning management systems, online classes and

digital content, but still faces fragmented data, uneven staff digital competence, limited learning analytics, non-standardised digital learning resources and insufficient internal regulations for quality, data protection and responsible AI use. The article proposes a six-pillar model consisting of digital governance, infrastructure and platforms, digital learning resources, data and learning analytics, digital competence, and quality-safety-ethics. It also outlines an implementation roadmap for 2026-2030, emphasising standardisation before scaling, dashboard-based management, early-warning learner support, AI governance and continuous quality improvement. The framework contributes a practical model for open higher education units seeking to transform technology use from operational support into strategic management capability.

Keywords: Digital Transformation, Higher Education, Open Education, Distance Learning, Learning Analytics, Digital Governance, AI in Education

1. Introduction

Higher education is being reshaped by digital platforms, artificial intelligence, data analytics, online learning, blended learning and the growing social demand for lifelong learning (OECD, 2023; UNESCO, 2024) ^[5, 8].

Digital transformation differs from ordinary information-technology application. Digitisation converts paper-based objects into digital formats; information-technology application supports individual tasks; digital transformation redesigns the operating model of an institution through connected processes, data-driven decision-making and new ways of creating educational value (Vial, 2019) ^[9].

This article aims to formulate an applied framework for digital transformation in the management and delivery of open higher education. It uses a case-based approach derived from an institutional research report on digital transformation in a Vietnamese open and distance education unit. The article intentionally omits the internal title and code of that report, focusing instead on generalisable academic and managerial insights. Four research questions guide the study: (1) What are the core dimensions of digital transformation in open higher education? (2) What maturity gaps appear when an institution moves from tool-based adoption to integrated digital operation? (3) Which opportunities and risks should be prioritised in management and training? (4) What implementation roadmap can support sustainable transformation?

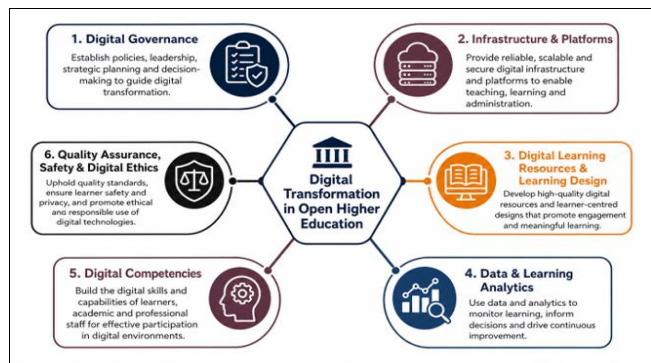


Fig 1: Six-pillar model for digital transformation in open higher education

2. Literature and Policy Background

The international literature frames digital transformation as a strategic response to disruptive digital technologies that changes organisational structures, processes and value propositions (Vial, 2019) [9]. In higher education, systematic reviews highlight several recurring themes: leadership and strategy, learning innovation, digital platforms, data governance, staff competence and organisational culture (Benavides et al., 2020; Bond et al., 2019) [1, 2].

Recent global frameworks reinforce this systemic perspective. UNESCO's six-pillar approach emphasises coordination and leadership, connectivity and infrastructure, cost and sustainability, capacity and culture, content and solutions, and data and evidence (UNESCO, 2024) [8]. The framework is particularly relevant to open and distance higher education because these institutions rely heavily on platform reliability, digital learning resources, learner support and quality assurance. OECD and the World Bank also stress that digital education ecosystems require not only technology but also data governance, teacher capacity, equity, trust and sustainable policies (OECD, 2023; World Bank, 2024) [5, 10].

In Viet Nam, digital transformation in education is supported by national strategies and sectoral programmes that promote online platforms, digital learning resources, data-based management and technology-enabled education services (Government of Viet Nam, 2020; Prime Minister of Viet Nam, 2022) [3, 6]. For distance higher education, regulatory requirements related to learning resources, teaching organisation, assessment and quality assurance create both an opportunity and a compliance obligation for open education institutions (Ministry of Education and Training of Viet Nam, 2023) [4].

2.1 Analytical Framework

Dimension	Core question	Implication for management and training
Digital governance	Is there a clear strategy, regulation and accountability mechanism?	Prevents fragmented projects and links technology to KPIs and quality improvement.
Infrastructure and platforms	Are LMS, academic management, content repository, assessment and support tools connected?	Creates a stable operating foundation for distance learning.
Digital learning resources	Are courses designed, produced, reviewed and	Improves learner experience and supports

	updated according to common standards?	compliance with distance education requirements.
Data and analytics	Can data be transformed into dashboards and early-warning interventions?	Supports evidence-based decisions and proactive learner support.
Digital competence	Do leaders, lecturers, managers, technicians and learners have role-based digital skills?	Reduces resistance and increases effective use of platforms.
Quality, safety and ethics	Are data privacy, copyright, academic integrity and AI use governed?	Protects learners, institutional reputation and legal compliance.

3. Methodology

The study adopts a qualitative case-study design supported by document analysis, policy review and applied management modelling. The primary data source is an institutional research report describing the current state, opportunities, challenges and proposed solutions for digital transformation in an open and distance education unit. The analysis was conducted in four steps.

First, the report was reviewed to extract recurring themes related to governance, platforms, digital learning resources, data, staff competence, quality assurance and learner support. Second, these themes were mapped against international and national policy frameworks on digital education. Third, a SWOT analysis was used to identify strengths, weaknesses, opportunities and threats. Fourth, a five-level digital maturity model was applied to distinguish between basic tool adoption, organised implementation, integrated operation, optimisation and intelligent digital services. This design is suitable for applied research because it links evidence from practice with a structured framework for managerial decision-making.

4. Findings and Discussion

4.1 Current Digital Transformation Profile

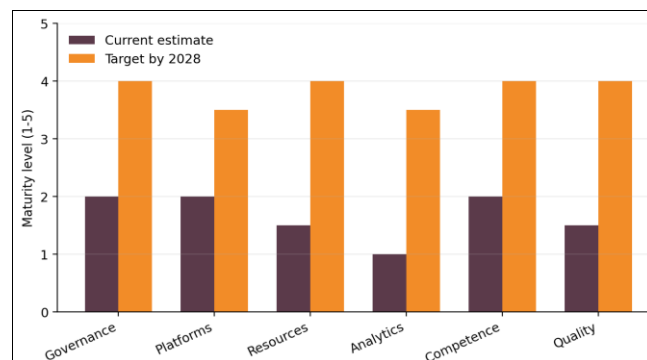


Fig 2: Estimated current and target digital maturity by pillar

The case evidence shows that the institution has made important initial progress. Learning management systems, online-meeting tools and digital teaching resources have been used in several training activities. Lecturers and administrators possess basic digital skills, and learners generally recognise the convenience of online learning. These results indicate that the institution has passed the stage of purely paper-based management and has entered an organised phase of digital tool adoption.

However, the current profile also reveals structural limitations. Platforms are not sufficiently integrated; learner

and course data are dispersed; digital learning resources are not yet governed by a uniform production, review and version-control process; the use of learning analytics and AI remains limited; and internal regulations for data governance, responsible AI, online assessment and digital evidence management are still incomplete. These weaknesses are typical of institutions that have adopted technology faster than they have redesigned processes and governance mechanisms.

4.2 SWOT Analysis

Strengths	Weaknesses
Functional mandate aligned with open education and educational technology; early experience in LMS and online classes; ability to collaborate with academic departments and technology partners; clear managerial need for innovation.	Fragmented platforms; dispersed data; non-standardised digital resources; uneven digital competence; limited incentives and KPI mechanisms; constrained financial resources.
Opportunities: national and sectoral digital transformation policies; rising demand for flexible learning; more accessible AI, LMS and content-production technologies; potential to expand learner markets.	Threats: competition in distance education; data-security and academic-integrity risks; fast-changing technology; legal-compliance requirements; organisational resistance to change.

The SWOT results suggest four strategic directions. The SO strategy is to use the institution's mandate and existing experience to develop flexible, data-supported learning services. The WO strategy is to use policy support and affordable digital tools to overcome weaknesses in infrastructure, learning-resource standards and digital competence. The ST strategy is to strengthen quality assurance and compliance to reduce competitive, legal and security risks. The WT strategy is to avoid scattered investment by prioritising standardisation, data governance and human capability before scaling enrolment and services. The most important managerial implication is that digital transformation should not begin with a technology-shopping list. It should begin with a limited number of foundational projects: an integrated platform architecture, a digital learning-resource production procedure, a dashboard for distance-learning management, a role-based digital competence programme, a learner early-warning workflow, and a regulation on data and responsible AI use.

4.3 Proposed Integrated Platform Architecture

A sustainable architecture should place the LMS at the centre of learning activities while connecting it to academic management, admission/customer relationship management, a digital learning-resource repository, assessment services, learner support and executive dashboards. The architecture must support role-based access, data export, API integration, logs, backup and quality-assurance evidence. This design reduces duplicate data entry and enables the institution to answer practical management questions: which courses meet digital-resource standards, which learners are at risk, which courses have low interaction, how quickly support requests are resolved and which learning materials require improvement.

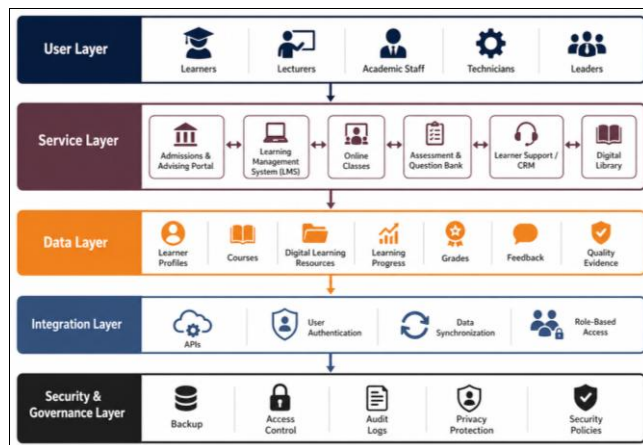


Fig 3: Proposed integrated digital platform architecture

4.4 Digital Learning Resources and Learning Analytics

Digital learning resources should be treated as academic products, not merely technical files. Each online course should include clear learning outcomes, a weekly or thematic structure, short instructional videos, readings, interactive activities, formative quizzes, assignments, discussion channels, assessment rubrics and learner guidance. A practical production process should include analysis of the syllabus, storyboard design, content development, multimedia production, technical packaging, academic and technical review, LMS deployment, usage monitoring and post-course improvement.

Learning analytics can convert LMS data into early-warning and improvement actions. A basic dashboard should track learner login within seven days, activity completion, on-time submission, quiz performance, forum participation, support requests, response time, digital-resource quality status and learner satisfaction. The value of analytics lies not in the dashboard itself but in the intervention workflow that follows. For example, a learner who has not logged in for seven days should trigger an adviser contact; a course with low completion should trigger a review of learning design; repeated technical issues should trigger system-level corrective action.

4.5 Core Management Indicators

Indicator	Measurement	Warning threshold	Management response
LMS login in 7 days	Active learners / total learners	< 70%	Reminder, adviser contact, technical check
Activity completion	Completed required activities / total activities	< 60%	Learning support and course-design review
On-time submission	On-time assignments / required assignments	< 75%	Deadline reminder and cause analysis
Standardised learning resources	Courses passing checklist / total courses	< 90%	Additional review and instructional-design support
Support response time	Average time to close support tickets	> 24-48 hours	Reassign workload and update FAQ
Learner satisfaction	End-of-course survey score	< 4/5	Analyse comments and implement improvement plan

5. Implementation Roadmap

The proposed roadmap follows the principle of standardising before scaling. In the first stage, the institution should issue a digital transformation strategy, establish a cross-functional digital transformation task force, define digital learning-resource standards, build a basic management dashboard and pilot a small number of standardised online courses. In the second stage, it should integrate LMS data with academic management, expand the digital-resource repository, deploy learner support services and apply early-warning analytics across programmes. In the third stage, it should develop a smart open education ecosystem using predictive analytics, responsible AI, workflow automation and personalised learner support.

Each stage must be governed as a portfolio of projects with explicit deliverables, responsible units, budget assumptions, risk controls and outcome indicators. Digital transformation should be embedded into daily work rather than treated as an external technology project. When the operation of classes, learning resources, learner support and quality assurance is standardised and digitised, technology becomes an institutional management capability.

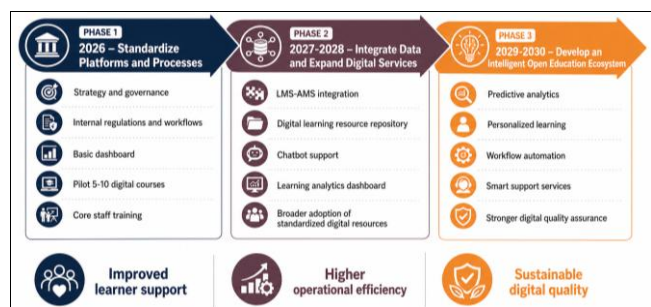


Fig 4: Implementation roadmap for 2026-2030

6. Quality Assurance, Data Safety and Responsible AI

Quality assurance in digital education should be embedded into every workflow. Learning materials must be reviewed before LMS publication; online classes must have interaction and assessment plans; learning data and evidence must be stored; learner feedback must be analysed; and courses must have improvement reports after each delivery cycle. Digital evidence, including logs, assessment records, feedback reports and version histories, should be organised in a quality-assurance repository.

Data safety requires role-based access, strong authentication for sensitive accounts, periodic backup, access logs, account life-cycle management and an incident-response procedure. Learner data should be used only for training, support and quality-improvement purposes. Responsible AI governance is also necessary: AI may assist in drafting, summarising, question generation and learner support, but academic staff must verify content, protect personal data and prevent plagiarism or over-reliance on generated outputs (UNESCO, 2023) [7].

7. Conclusion

This article has proposed a case-based framework for applying technology in the management and delivery of open higher education. The central finding is that the institution has moved beyond initial tool adoption but has not yet reached integrated, data-driven and optimised digital operation. The most urgent gaps are not only technical; they also involve governance, learning-resource standards, data

integration, digital competence, quality assurance and responsible AI use.

The six-pillar model and 2026-2030 roadmap provide a practical path for transformation. In the short term, priority should be given to standardising processes, building dashboards, developing digital learning-resource standards and training core teams. In the medium term, the institution should integrate data and expand digital learner support. In the long term, it can move toward an intelligent open education ecosystem with predictive analytics, personalised support and continuous quality improvement. The framework can be adapted by similar higher education units that seek to transform technology use from fragmented support into strategic institutional capability.

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