Endowing the Digital Turn: A *Maqāṣid*-Anchored Conceptual Framework Integrating Waqf Financing, Educational Technology, and Islamic Education

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ABSTRACT

The accelerating digitalisation of Islamic educational institutions has outpaced the financing architectures that are supposed to sustain it. This article develops an integrative conceptual framework that connects three literatures which have so far advanced in parallel: educational technology, Islamic education, and waqf-based educational financing. The study adopts a theory-synthesis design for conceptual papers, drawing on a purposively constructed corpus of eighty-one peer-reviewed publications retrieved from Scopus, Web of Science, DOAJ, and SINTA, with journal articles restricted to 2021–2026 and books to 2016–2026. Analysis proceeded through open, axial, and integrative coding, followed by proposition building and framework articulation. The synthesis yields the Waqf–Technology–Tarbiyah (WTT) framework, which specifies three dyadic intersections, namely sustainable financing, value-aligned mediation, and endowed access equity, all evaluated against maqāṣid al-sharīʻah. The framework identifies a structural mismatch between the perpetuity logic of waqf capital and the obsolescence logic of digital assets, and resolves it through a corpus-and-reserve architecture that separates capital from operational expenditure windows. Four institutional maturity levels are proposed, together with a maqāṣid-referenced audit instrument. The article contributes a theoretically grounded and operationally specific model that reframes educational technology not as a procurement problem but as an endowable public good within Islamic educational institutions. Implications for nazhir professionalisation, teacher capability, and regulatory design are discussed.

Keywords: educational technology; Islamic education; maqāṣid al-sharīʻah; tarbiyah; waqf financing

INTRODUCTION

Islamic educational institutions across the Muslim world are presently caught in a difficult double bind. On one side, governments, accreditation bodies, parents, and students increasingly expect these institutions to deliver technology-mediated learning of a quality comparable to that of well-resourced secular providers. On the other side, the same institutions frequently operate on fee structures deliberately kept low for reasons of social justice and religious obligation. Madrasahs, pesantren, and Islamic higher education institutions therefore confront a recurring financing gap that ordinary tuition revenue cannot close. The gap is not a one-off capital shortfall that a single grant might resolve. It is a permanent operating deficit generated by technologies whose costs recur annually and whose useful life is short. Understanding this structural condition is the point of departure for the present article, because a permanent deficit requires a permanent income source rather than a larger one-off injection. The distinction between these two remedies is easily overlooked in policy discussion, yet it determines whether a digitalisation programme survives its third year.

The educational technology literature has documented both the promise and the fragility of digital transformation in schooling. Recent evidence indicates that artificial intelligence and adaptive platforms can enhance engagement, personalise instruction, and extend the reach of scarce teaching expertise (Radif, 2024; Wedi et al., 2025). At the same time, systematic reviews caution that large language models introduce unresolved practical and ethical difficulties concerning transparency, assessment integrity, and equity of access (Yan et al., 2024). Meta-analytic work further shows that device availability alone does not translate into learning gains, and may even widen existing disparities where pedagogical support is absent (Wang et al., 2024). The lesson drawn from this body of work is consistent and sobering. Technology yields educational value only when it is embedded within sustained institutional capability, and such capability is expensive to build and even more expensive to maintain.

Islamic education adds a further layer of normative complexity to this picture. Its aims are not exhausted by measurable competence, since the tradition understands education as the cultivation of adab, the transmission of authenticated knowledge, and the formation of moral character through relational apprenticeship. Contemporary scholarship has begun to specify what these commitments imply for digital mediation, arguing that technological choices in Islamic institutions must be assessed against ethical rather than merely functional criteria (Ahmad et al., 2025; Mukmin Hakim & Mat Jubri Shamsuddin, 2024). Studies of madrasah digitalisation similarly report that platform adoption tends to remain shallow, concentrating on administrative substitution rather than pedagogical redesign (Huda et al., 2024; Umah et al., 2023). Where design is taken seriously the picture changes, as a hypercontent digital flipbook deployed in blended learning within Indonesian madrasah demonstrably improved conceptual understanding in Islamic education (Zh et al., 2026). The persistent question is therefore not whether Islamic institutions should digitalise, but on what terms and toward which formative ends.

Waqf, the Islamic endowment, has historically financed precisely this kind of long-horizon educational provision. Contemporary scholarship has revived interest in its financing potential, examining productive waqf models for Indonesia (Ascarya et al., 2022), waqf-financed higher education in Pakistan and Malaysia (Usman & Ab Rahman, 2021, 2023), waqf investment funds in Saudi Arabia (Elmahgop et al., 2025), and Islamic social finance responses to educational deficits in Northern Nigeria (Tijani & Al-Shagdari, 2024). Indonesia illustrates the scale of the untapped opportunity with unusual clarity. National authorities estimate annual cash waqf potential at approximately Rp181 trillion against realised collection of roughly Rp3.5 trillion, while some 451,000 registered waqf land points include around 45,000 sites with economic potential of which only about 2,000 are productively deployed (Badan Wakaf Indonesia, 2025). The mobilisation problem is thus one of institutional design rather than of latent generosity.

Digitalisation has itself become a major theme within waqf scholarship, though almost entirely as an instrument for collecting waqf rather than as an object of waqf expenditure. Researchers have examined blockchain-enabled transparency in

endowment management (Aysan & Al-Saudi, 2023; Setiawan & Nurzaman, 2022), the transformation of cash waqf administration through digital channels (Adinugraha et al., 2024; Almomani et al., 2024), philanthropic intention among digitally mediated donors (Bonang et al., 2024; Nour Aldeen et al., 2022), and the emergence of Waqf 4.0 as an integrative managerial paradigm (Awalluddin et al., 2024). Parallel work has assessed instrument innovation, including cash waqf linked sukuk and waqf-based crowdfunding for educational purposes (Lahuri & Lutfiah, 2024; Mohd Hosen et al., 2025; Yumna et al., 2024). Technology in this literature functions as a fundraising channel, and its own financing requirements are seldom examined.

Reading these three literatures alongside one another reveals a conspicuous absence rather than a contradiction. The educational technology literature specifies what digital transformation costs but rarely asks who should pay for it in institutions that cannot raise fees. The Islamic education literature specifies the normative criteria that technology must satisfy but seldom engages the financing question at all. The waqf literature specifies how endowment capital can be mobilised and governed but treats education as an undifferentiated beneficiary category rather than as a sector with distinctive and recurrent digital cost structures. No available framework simultaneously theorises the perpetuity logic of endowment capital, the obsolescence logic of digital assets, and the formative logic of Islamic pedagogy. Isolated proposals for digital waqf in education exist (Zulkarnain et al., 2025), yet they remain descriptive and do not resolve the underlying temporal mismatch between the three domains.

This article addresses that absence by constructing an integrative conceptual framework. Three questions organise the inquiry. First, what structural properties of waqf capital make it suitable, and in what respects unsuitable, for financing educational technology in Islamic institutions? Second, how do the normative commitments of Islamic education constrain and reshape the technology choice set that endowment funding might otherwise underwrite? Third, what governance architecture allows waqf-financed educational technology to remain accountable to maqāṣid al-sharīʿah across successive technology generations? The unit of analysis is the Islamic educational institution understood as a financing and pedagogical system, rather than the individual learner or the national policy regime. Indonesia supplies the principal illustrative context because of its exceptional combination of waqf scale, madrasah density, and documented digital inequality. The choice of context is illustrative rather than restrictive, since the structural logic developed here should apply wherever endowment institutions and Islamic schooling coexist. Where jurisdictional differences matter, particularly regarding the juristic status of cash waqf, those differences are noted explicitly in the discussion.

The remainder of the article proceeds in five movements. The methods section explains the theory-synthesis design, the construction of the conceptual corpus, and the coding procedures that generated the framework. The results section presents the corpus composition, characterises each constituent domain, specifies the three dyadic intersections, and articulates the Waqf–Technology–Tarbiyah framework together with its operational architecture and maturity levels. The discussion section answers the three

research questions in sequence, positions the framework against established scholarship, and derives implications for practice and policy. The conclusion summarises the argument and identifies an agenda for empirical testing. A brief acknowledgement closes the article.

METHOD

This study is a conceptual article, and its methodological commitments follow the conventions established for that genre rather than those governing empirical inquiry. Conceptual work does not generate new observations; it reorganises existing knowledge to produce explanatory structures that were not previously available. Among the recognised approaches to such work, this article adopts theory synthesis, which integrates concepts drawn from separate literatures into a coherent account of a phenomenon that none of them explains adequately alone (Jaakkola, 2020). Theory synthesis is the appropriate choice here because the phenomenon of interest, namely waqf-financed educational technology in Islamic institutions, is constituted by the intersection of three domains that are conventionally studied in isolation. The validity of a synthesis of this kind rests on the transparency of its source selection, the systematicity of its coding, and the logical defensibility of the propositions it derives. Each of these requirements is addressed below.

The research proceeded through four sequential stages, which are represented graphically in Figure 1. The first stage delineated the three constituent domains and established working definitions for waqf, educational technology, and Islamic education as they would be used throughout the analysis. The second stage constructed the conceptual corpus through database searching, screening, and eligibility appraisal. The third stage applied three cycles of coding to the eligible sources in order to surface recurrent constructs and the relations among them. The fourth stage converted the coded material into integrative propositions and articulated these propositions as a framework with an accompanying operational architecture. Reporting of the identification and screening steps was informed by established guidance for transparent review reporting (Page et al., 2021), although the review is integrative rather than systematic in its aims.

Corpus construction drew on four databases selected for their complementary coverage. Scopus and Web of Science supplied internationally indexed scholarship, the Directory of Open Access Journals extended coverage to open-access outlets in Islamic studies, and SINTA captured the substantial Indonesian-language literature on waqf and madrasah governance. Search strings combined domain terms in Boolean form, pairing waqf, endowment, and Islamic social finance with education, madrasah, pesantren, and higher education, and pairing educational technology, digital transformation, e-learning, and artificial intelligence with Islamic education, tarbiyah, and madrasah. Retrieved records were screened against explicit criteria. Journal articles were eligible when published between 2021 and 2026, while books and monographs were eligible when published between 2016 and 2026, so that the evidentiary base would reflect the post-

pandemic reconfiguration of both digital schooling and Islamic philanthropy. Records were excluded when they lacked peer review, when bibliographic identifiers could not be retrieved, when they duplicated an already included record, or when they fell outside the stipulated temporal window.

Screening reduced an initial pool of four hundred and thirty-seven records to eighty-four eligible sources. Titles and abstracts were reviewed first, after which full texts were appraised for substantive engagement with at least one focal domain and for demonstrable relevance to the intersection under investigation. Sources engaging two or more domains were flagged as bridging literature and were read with particular attention, since these works indicate where integration has already been attempted and where it has stalled. Grey literature was admitted only in the restricted case of authoritative statistical reporting by national waqf regulators, because no peer-reviewed equivalent exists for the current Indonesian endowment aggregates, and such figures are material to the argument about scale. Where regulatory figures were used, they were cross-checked against at least two independent reports of the same statement before inclusion.

Analysis employed three coding cycles conducted manually and recorded in an auditable coding register. Open coding assigned descriptive labels to every passage bearing on financing structure, technological affordance, pedagogical aim, governance mechanism, or ethical constraint. Axial coding then clustered these labels into higher-order categories and specified the relations among them, distinguishing enabling conditions, constraining conditions, and outcome states. Integrative coding, the third cycle, deliberately worked across domain boundaries, asking of each category whether it possessed analogues in the other two literatures and whether those analogues stood in relations of reinforcement, tension, or contradiction. The three dyadic intersections reported in the results emerged from this third cycle, as did the temporal mismatch that the framework is designed to resolve. Analytic memos written throughout the process recorded the reasoning behind each categorical decision.

Because conceptual research depends heavily on interpretive judgement, several procedures were adopted to strengthen trustworthiness. Source triangulation ensured that no substantive claim rested on a single publication, and every proposition in the framework is supported by evidence drawn from at least two independent sources. An audit trail comprising the search log, the screening decisions, the coding register, and the analytic memos was maintained so that the inferential path from corpus to framework can be reconstructed by others. Peer debriefing was conducted with two subject specialists, one in Islamic economics and one in educational technology, who reviewed the emergent categories and challenged the initial formulation of the intersections. Reflexive memoing recorded the researcher's own institutional location within an Indonesian Islamic educational network, since that location shapes both access to the literature and sensitivity to particular problems.

Two limitations of the design should be stated plainly at the outset. First, a synthesised framework is a proposition-generating instrument rather than a validated model, and its constructs await empirical measurement in specific institutional settings. Second, the corpus is weighted toward Indonesian and Malaysian scholarship because those jurisdictions have produced the densest recent literature on both waqf innovation and madrasah digitalisation, which means that transferability to Arab, South Asian, or minority-Muslim contexts requires deliberate contextual adjustment. These limitations do not undermine the contribution, but they do delimit the claims that the article is entitled to make. The framework should accordingly be read as a structured hypothesis about how three domains might be integrated, and as an invitation to the empirical work that would test it.

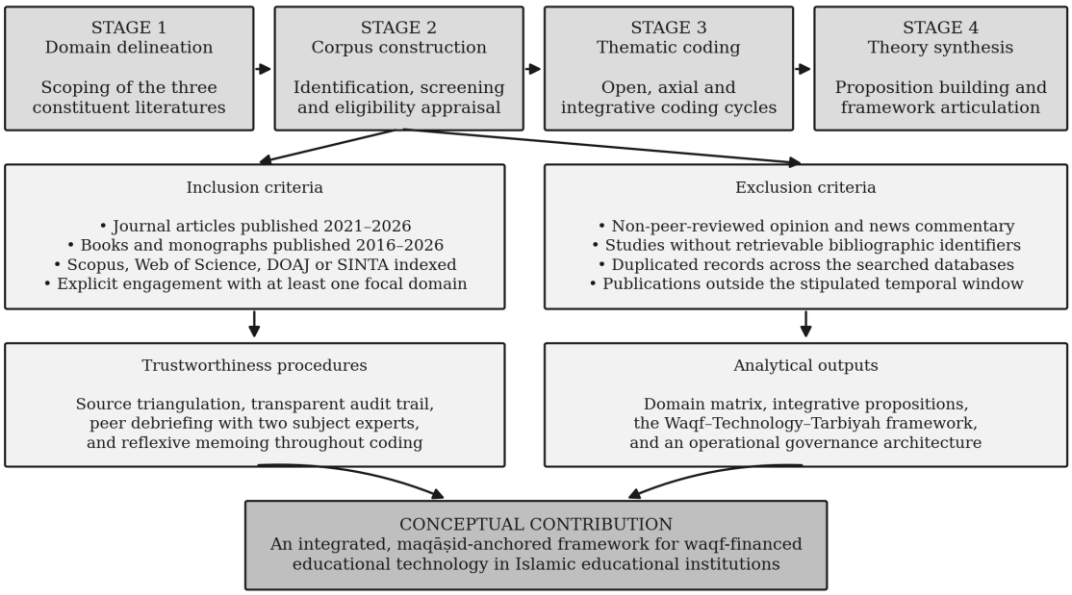

Figure 1. Four-stage theory-synthesis procedure adopted in this study

Figure 1 displays the sequence through which the conceptual corpus was assembled and converted into the framework. The upper band shows the four analytical stages, the middle band shows the eligibility rules applied during screening, and the lower band shows the trustworthiness procedures and the analytical outputs they produced. The design follows established guidance on conceptual article construction (Jaakkola, 2020) and on transparent review reporting (Page et al., 2021).

RESULTS

Composition of the Conceptual Corpus

The eligible corpus of eighty-four sources distributed unevenly across the three focal domains, and the pattern of that distribution is itself a finding. Table 1 reports the composition. Waqf financing accounted for the largest share, reflecting a decade of

intensive scholarly attention to Islamic social finance. Educational technology in Islamic settings formed the second largest cluster, expanding sharply after 2021 in response to pandemic-driven remote schooling. The normative literature on Islamic education contributed a smaller but conceptually decisive group of sources. Only eleven publications engaged two domains simultaneously, and none developed an integrated treatment of all three with operational specificity. Recent contributions in the educational technology cluster were drawn in part from newly established outlets addressing developing-country contexts directly, since these venues publish the design-oriented and equity-sensitive scholarship that mainstream journals underrepresent (Haditia et al., 2026; Sinaga et al., 2026).

Table 1. Composition of the conceptual corpus by domain and publication type

Domain cluster	Journal articles	Books and chapters	Regulatory reports	Total
Waqf financing and Islamic social finance	26	3	3	32
Educational technology and digital transformation	25	2	0	27
Islamic education and maqāṣid-based ethics	11	3	0	14
Bridging literature engaging two domains	10	1	0	11
Total	**72**	**9**	**3**	**84**

The table shows that scholarship on the three domains is substantial but compartmentalised, since bridging work constitutes less than fourteen per cent of the corpus. This distribution corroborates the observation that digitalisation appears in waqf research primarily as a fundraising channel (Adinugraha et al., 2024; Awalluddin et al., 2024), while financing appears in educational technology research only as an unexamined background condition (Wedi et al., 2025).

Structural Profiles of the Three Constituent Domains

Coding of the waqf cluster surfaced four structural properties that distinguish endowment capital from other financing sources. Perpetuity is the first and most consequential property, because the corpus of a valid waqf must be preserved intact while only its usufruct is appropriated for beneficiaries. Irreversibility is the second, since a dedication once made cannot ordinarily be revoked by the founder or redirected by the trustee. Intergenerational orientation is the third, meaning that the beneficiary class extends indefinitely into the future rather than terminating with a project cycle. Institutional intermediation is the fourth, because the nazhir stands between founder and beneficiary as a fiduciary whose competence determines whether the endowment yields anything at all. Recent scholarship confirms that nazhir capability, not donor willingness,

is the binding constraint on waqf productivity in Indonesia and elsewhere (Ascarya et al., 2022; Nofianti et al., 2024).

Coding of the educational technology cluster produced a strikingly inverse profile. Digital assets are characterised by rapid obsolescence, with hardware refresh cycles typically spanning three to five years and platform licences renewing annually. They exhibit high scalability, since marginal cost per additional user is low once fixed infrastructure exists. They generate a recurrent rather than a one-off cost structure, because licensing, connectivity, maintenance, security, and professional development all repeat indefinitely. They also display strong complementarity with human capability, since the meta-analytic evidence demonstrates that device access without pedagogical support produces negligible or negative learning effects (Wang et al., 2024). Studies of madrasah digitalisation confirm this complementarity in Islamic settings, reporting that infrastructure investment without teacher development yields substitution rather than transformation (Huda et al., 2024; Umah et al., 2023). Design-based work reaches the same conclusion from the opposite direction, since a digital library-based learning management system succeeded in developing technological content knowledge only because it was paired with an explicit instructional strategy (Sinaga et al., 2026).

Coding of the Islamic education cluster yielded three normative demands that any financing or technological arrangement must satisfy. The first is relational integrity, which holds that the teacher–student bond carries formative and not merely instructional weight, and that mediation which reduces this bond to a service transaction damages the educational act itself. The second is epistemic authentication, which holds that religious knowledge derives authority from verified transmission and qualified interpretation, so that unverified machine-generated content poses a distinctive risk in this domain rather than a generic one. The third is formative teleology, which holds that education aims at the cultivation of character and orientation toward the divine, so that success metrics confined to measurable performance are systematically incomplete. Contemporary scholarship articulating maqāṣid-based evaluation of digital tools converges on these demands (Ahmad et al., 2025; Auda, 2022; Mukmin Hakim & Mat Jubri Shamsuddin, 2024).

A separate reading of the eleven bridging publications clarified how far integration has already advanced and where it halts. Several studies propose waqf-based financing for education in general terms and mention digital delivery as an incidental benefit rather than as a costed commitment (Fauzi, 2021; Tijani & Al-Shagdari, 2024). Others propose digital platforms for Islamic learning and mention philanthropic funding as a possible source without specifying its structure (Hakimi et al., 2024; Suhendi, 2024). A third group approaches genuine integration by proposing digital waqf frameworks for educational funding, yet these accounts remain at the level of platform description and do not address what happens when the funded technology reaches end of life (Almomani et al., 2024; Zulkarnain et al., 2025). The bridging literature therefore establishes plausibility without establishing feasibility, and the difference between those two claims is precisely the gap the present framework occupies.

Placing the three profiles side by side exposes the central analytical problem, which Table 2 sets out systematically. Waqf capital is durable, illiquid, and oriented to perpetuity, whereas digital assets are perishable, cash-hungry, and oriented to replacement. A naive application of endowment funding to technology procurement therefore fails predictably, because the endowed asset depreciates to zero while the obligation to preserve the corpus remains binding in perpetuity. This mismatch has not previously been named in the literature, yet it explains a familiar pattern of failure in which institutions receive donated hardware, deploy it enthusiastically, and find themselves unable to sustain, replace, or support it three years later.

Table 2. Structural profiles of the three domains and the resulting integration problem

Dimension	Waqf capital	Educational technology	Islamic education
Temporal logic	Perpetuity; corpus preserved indefinitely	Obsolescence; three to five year refresh cycle	Generational; formation across a life course
Cost behaviour	One-off dedication yielding recurring usufruct	Recurrent licensing, connectivity and maintenance	Labour-intensive and resistant to scale economies
Reversibility	Irreversible once validly dedicated	Highly substitutable and frequently replaced	Cumulative and path-dependent in character
Primary constraint	Nazhir competence and governance quality	Human capability and pedagogical integration	Preservation of relational and epistemic integrity
Success criterion	Corpus preserved and usufruct distributed	Adoption depth and measurable learning gain	Adab, authenticated knowledge and character

Reading across the rows reveals the mismatch that motivates the framework, since the perpetuity requirement of column two collides directly with the obsolescence dynamic of column three. Prior studies have documented each column separately (Ascarya et al., 2022; Wang et al., 2024; Auda, 2022), but the collision between them has not been theorised as a design problem requiring institutional resolution.

The Waqf–Technology–Tarbiyah Framework

Integrative coding identified three dyadic intersections at which the domains meet productively, and these intersections constitute the core of the proposed framework. The first intersection, sustainable financing, joins waqf capital to educational technology. Its central claim is that endowment funding becomes viable for digital provision only when the endowed asset is the corpus rather than the equipment, so that technology is financed from a perpetual income stream rather than being itself endowed. The second

intersection, value-aligned mediation, joins educational technology to Islamic education. Its central claim is that technological affordances must be selected and configured against maqāṣid criteria before deployment, rather than being evaluated retrospectively for compliance. The third intersection, endowed access equity, joins waqf capital to Islamic education. Its central claim is that endowment income is uniquely suited to funding need-based access provision, because it removes the cross-subsidy pressure that otherwise forces institutions to raise fees precisely for the students least able to pay.

Each intersection can be stated as a formal proposition amenable to subsequent empirical testing. The first proposition holds that the sustainability of technology provision in an Islamic educational institution varies with the proportion of its digital expenditure financed from endowment usufruct rather than from tuition or episodic donation. The second proposition holds that the depth of pedagogical integration achieved by a given technology varies with whether maqāṣid criteria were applied at the specification stage rather than at the review stage. The third proposition holds that the equity effect of an institution's technology programme varies with the presence of an endowment-funded access subsidy that is insulated from the institution's fee structure. Stated in this form, the three propositions specify directional relationships that a suitably designed empirical study could confirm or disconfirm. They also make explicit what the framework asserts and, equally importantly, what it does not assert, since none of the propositions claims that endowment financing improves learning outcomes directly.

Figure 2 renders the resulting Waqf–Technology–Tarbiyah framework in visual form. The three domains appear as overlapping fields whose pairwise intersections correspond to the three propositions just stated, and whose triple intersection constitutes the WTT core where all three logics must be satisfied simultaneously. Encompassing the whole is the evaluative horizon of maqāṣid al-sharīʿah, articulated through the five customary objectives, which supplies the criteria against which every design decision is finally assessed. Three enabling layers sit beneath the framework and represent the institutional conditions without which the intersections remain theoretical. These are a governance layer resting on nazhir professionalism, a capability layer resting on teacher digital and juristic literacy, and an accountability layer resting on maqāṣid-referenced audit.

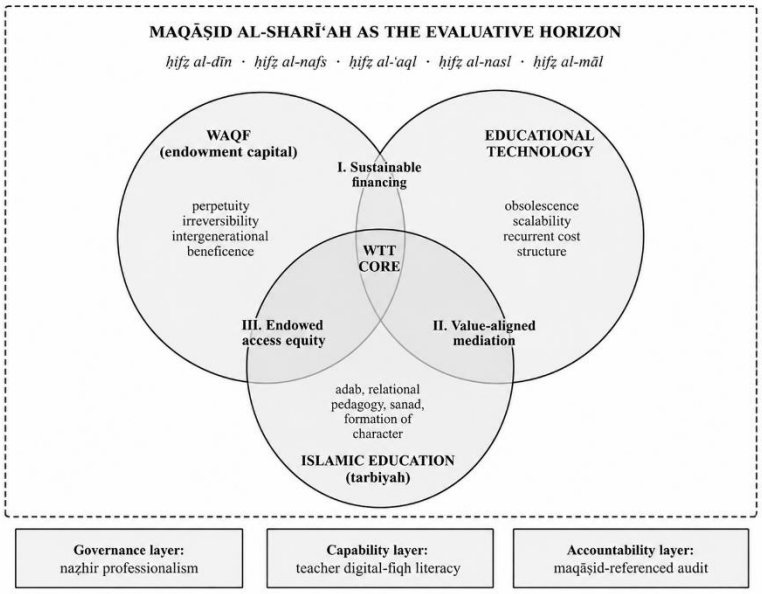

Figure 2. The Waqf–Technology–Tarbiyah (WTT) conceptual framework

Figure 2 presents the three constituent domains as overlapping fields. Intersection I denotes sustainable financing, intersection II denotes value-aligned mediation, and intersection III denotes endowed access equity, while the central region denotes the conditions under which all three logics are satisfied simultaneously. The surrounding band represents maqāṣid al-sharīʿah as the evaluative horizon, and the three panels beneath represent the institutional layers required for the framework to operate in practice.

Operational Architecture of Waqf-Financed Educational Technology

The framework acquires operational content through the architecture presented in Figure 3, which traces the movement of value from mobilisation through intermediation and deployment to formation. Waqf resources enter from a diversified founder base comprising retail cash waqf, corporate dedications, waqf-linked sukuk subscriptions, alumni and diaspora contributions, and dedicated land or property. The nazhir entity performs registration, investment, risk segregation, digital reporting, and sharia supervision, and its capacity at this node determines the productivity of everything downstream. The endowment corpus is preserved intact, and only its usufruct is appropriated for annual expenditure, in accordance with the classical requirement. A reserve sub-fund receives a defined proportion of annual yield and functions as a counter-cyclical buffer that finances refresh and replacement cycles when equipment reaches end of life.

Expenditure is deliberately bifurcated into two windows whose separation resolves the temporal mismatch identified earlier. The capital expenditure window finances connectivity backbones, server and cloud provisioning, learning-device endowment for students, digital library and manuscript digitisation, and studios or laboratories for content production. The operational expenditure window finances platform licensing,

continuous teacher professional development, authorship of open Islamic learning resources, data stewardship and cyber safeguarding, and needs-based connectivity subsidies. Because both windows draw on usufruct rather than corpus, the endowment survives the depreciation of every asset it purchases. Table 3 matches waqf instruments to these expenditure categories, showing which instruments suit lumpy capital outlays and which suit smooth recurrent commitments.

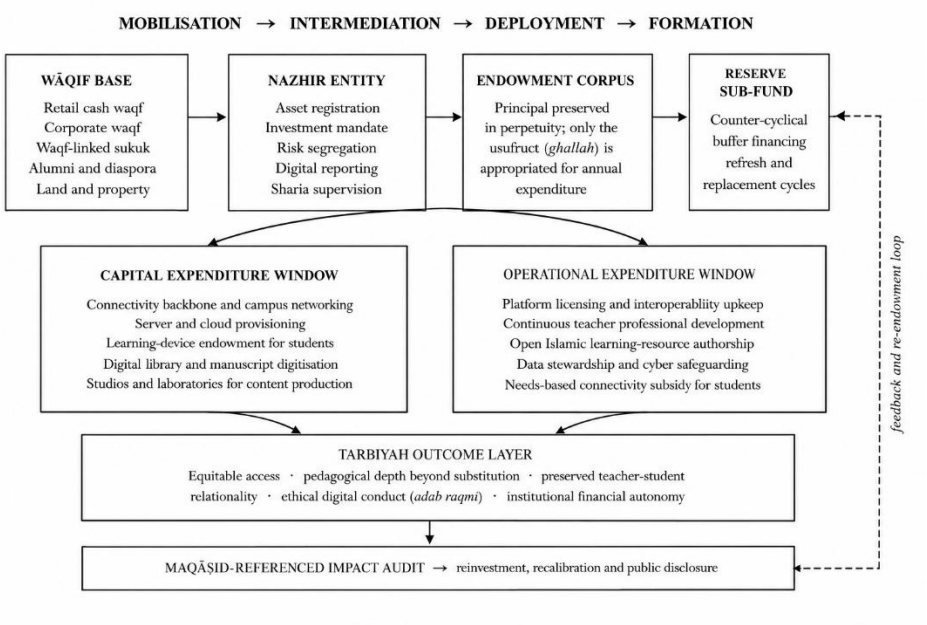

Figure 3. Operational architecture of the corpus-and-reserve financing model

Figure 3 traces value from mobilisation through intermediation and deployment to formation. The endowment corpus remains intact while its usufruct supplies two separated expenditure windows, and a reserve sub-fund absorbs replacement cycles. The feedback loop returns audit findings to the mobilisation stage, so that disclosed performance informs subsequent dedication. The design responds to governance weaknesses documented in comparative studies of cash waqf administration (Nofianti et al., 2024).

The architecture incorporates four control mechanisms that address risks identified during coding. Risk segregation at the nazhir node prevents the technology corpus from being commingled with endowments dedicated to other purposes, thereby protecting founders from the redirection of their intent. A defined appropriation ceiling limits annual withdrawal to a stated proportion of realised yield, which protects the corpus against erosion during periods of weak investment performance. A replacement schedule attached to every capital asset triggers reserve accumulation from the moment of acquisition rather than at the point of failure, which converts obsolescence from a shock into a planned event. Public disclosure of both windows, reported separately, exposes the institution to external scrutiny of whether operational commitments are genuinely being sustained. These controls respond directly to the governance weaknesses that comparative studies of cash waqf administration have documented

across Indonesia, Malaysia, and Türkiye (Nofianti et al., 2024), and they operationalise the transparency claims that digital waqf scholarship advances at a more general level (Aysan & Al-Saudi, 2023; Setiawan & Nurzaman, 2022).

Table 3. Matching waqf instruments to educational technology expenditure profiles

Waqf instrument	Cash-flow character	Best-fitted expenditure	Principal design caution
Retail cash waqf via digital channels	Small, frequent and irregular inflows	Operational window; connectivity subsidy	Requires low-cost aggregation and donor reporting
Corporate and institutional waqf	Large, periodic and negotiated inflows	Capital window; infrastructure backbone	Risk of donor-driven specification mismatch
Cash waqf linked sukuk	Predictable coupon over a fixed tenor	Operational window; licensing and staffing	Redemption at maturity constrains long planning
Productive land and property waqf	Rental yield contingent on asset management	Reserve sub-fund; replacement cycles	Demands commercial competence within the nazhir
Waqf-based crowdfunding campaigns	Episodic and campaign-dependent inflows	Capital window; discrete device cohorts	Vulnerable to attention decay after launch

The matching logic follows the principle that lumpy inflows should finance lumpy outlays while smooth inflows should finance recurrent commitments. Empirical studies of instrument performance support these pairings, particularly regarding the predictability of sukuk-linked returns (Yumna et al., 2024) and the episodic character of crowdfunding revenue (Lahuri & Lutfiah, 2024).

Institutional Maturity and Maqāṣid-Referenced Audit

Coding also produced a developmental sequence describing how institutions progress toward integrated practice, and Table 4 presents this as four maturity levels. The sequence is analytical rather than strictly chronological, since institutions may advance unevenly across the governance, capability, and accountability layers. Its diagnostic value lies in locating where a given institution currently stands and identifying the specific constraint that blocks advancement to the next level. Notably, the transition from the second to the third level is the most demanding, because it requires the nazhir to move from passive custodianship to active investment management, and it requires the academic leadership to move from procurement thinking to pedagogical design.

Table 4. Institutional maturity levels for waqf-financed educational technology

Level	Financing pattern	Technology use	Accountability practice
1. Dependent	Ad hoc donation and government grant	Substitution of existing administrative tasks	Narrative reporting to donors only
2. Custodial	Registered waqf assets held without yield	Isolated platform pilots without integration	Compliance reporting to the regulator
3. Productive	Corpus generating usufruct with a reserve	Pedagogical redesign supported by training	Financial audit with outcome indicators
4. Integrated	Diversified instruments matched to windows	Transformative and maqāṣid-screened design	Maqāṣid-referenced audit disclosed publicly

The levels summarise a progression from dependence to integration in which financing structure, technological depth, and accountability practice advance together. The pattern is consistent with findings that shallow digital adoption co-occurs with weak institutional governance in madrasah settings (Umah et al., 2023; Wedi et al., 2025), and with evidence that procurement decisions in low-resource systems lack evaluative instruments capable of assessing governance and equity dimensions (Haditia et al., 2026).

Advancement to the fourth level depends on an audit instrument capable of reporting formative outcomes without collapsing them into proxies. Coding of the normative literature suggested five indicator families corresponding to the customary objectives. Preservation of religion is indicated by the verifiability of religious content delivered through digital channels and by the presence of qualified scholarly review over that content. Preservation of intellect is indicated by evidence of higher-order cognitive engagement rather than mere completion metrics. Preservation of life is indicated by safeguarding practice covering screen exposure, data protection, and online harm.

Preservation of lineage is indicated by the maintenance of teacher–student relational contact alongside mediated instruction. Preservation of wealth is indicated by the ratio of endowment-financed to fee-financed technology expenditure and by the adequacy of the reserve against the replacement schedule. Reporting against these families would allow an institution to demonstrate alignment in terms the tradition recognises, rather than in terms borrowed wholesale from secular quality assurance regimes (Auda, 2022; Ardiani et al., 2025). The proposed indicator families are nonetheless compatible with emerging technical instruments, since a validated quality assurance framework for artificial intelligence in low-resource educational settings likewise foregrounds data governance, equity, and evidence as systematically weak dimensions (Haditia et al., 2026).

DISCUSSION

The first research question asked what structural properties make waqf capital suitable, and in what respects unsuitable, for financing educational technology. The analysis supports a qualified affirmative answer whose qualification is decisive. Waqf is exceptionally well suited to financing the recurrent obligations that defeat conventional funding, because a preserved corpus generates income indefinitely without requiring renewed fundraising each year. This property directly addresses the sustainability problem that the educational technology literature identifies but does not solve (Wang et al., 2024; Yan et al., 2024). Waqf is correspondingly ill suited to being embodied in the technology itself, since a dedicated asset that depreciates to worthlessness within five years cannot satisfy the perpetuity requirement in any meaningful sense. The resolution proposed here, namely endowing the corpus and expending only the usufruct, is not an innovation in Islamic law but a recovery of its classical structure, applied to an asset class the classical jurists did not encounter.

This resolution advances the existing literature in a specific way. Studies of waqf-financed higher education have documented institutional arrangements in Pakistan and Malaysia and have identified governance weakness as the limiting factor (Usman & Ab Rahman, 2021, 2023). Studies of digital waqf have documented technological improvements in collection and reporting (Adinugraha et al., 2024; Almomani et al., 2024; Aysan & Al-Saudi, 2023). Neither strand has asked what happens when the object of expenditure is itself technological, and it is precisely at that point that the perpetuity requirement becomes analytically interesting. The corpus-and-reserve architecture proposed in Figure 3 offers a determinate answer, and it converts a jurisprudential constraint into an operational advantage, because the reserve sub-fund institutionalises the replacement cycle that ad hoc funding never anticipates.

The second research question asked how the normative commitments of Islamic education constrain the technology choice set. The analysis indicates that these commitments operate as a prior screen rather than as a subsequent compliance check, and this distinction carries substantial practical weight. Under a compliance model, an

institution adopts a platform and then attempts to mitigate its objectionable features, which typically produces superficial adjustments such as content filtering. Under the screening model implied by the framework, maqāṣid criteria enter the specification stage, so that a tool failing to preserve relational integrity or epistemic authentication is not selected in the first place. The three normative demands identified in the results translate into concrete selection criteria, and they explain why generic adoption models require modification in Islamic settings. The feasibility of screening at that earlier stage is supported by recent instrument development, since a six-dimension quality assurance framework operationalised through forty-two indicators has already been validated for evaluating artificial intelligence products before procurement in low-resource systems (Haditia et al., 2026). Adding a maqāṣid dimension to an instrument of that kind is a tractable extension rather than a wholly new undertaking.

The framework accordingly extends rather than merely applies existing scholarship on maqāṣid-based evaluation. Recent work has proposed maqāṣid frameworks for assessing artificial intelligence in Islamic higher education and for cultivating ethical digital competency among adolescents (Ahmad et al., 2025; Mukmin Hakim & Mat Jubri Shamsuddin, 2024). That work operates predominantly at the level of individual conduct and institutional policy statements. The present framework locates maqāṣid evaluation at the point where money is committed, which is a more consequential intervention because financing decisions determine which technologies become available for conduct in the first place. Auda's argument that maqāṣid methodology should re-envision Islamic higher education as a whole system is thereby given a financing dimension that his account leaves implicit (Auda, 2020, 2022).

The third research question asked what governance architecture sustains accountability across technology generations. Three conditions emerged from the analysis, and all three are institutional rather than technical. The first condition is nazhir professionalisation, since the evidence consistently identifies trustee capability as the binding constraint on endowment productivity (Ascarya et al., 2022; Nofianti et al., 2024). A nazhir managing a technology-financing corpus requires investment competence, technological literacy, and sharia knowledge in combination, which is a demanding specification that few Indonesian nazhir currently satisfy. The second condition is teacher capability development funded from the operational window as a permanent commitment rather than a project expense, since the evidence indicates that technological content knowledge develops only where platform provision is coupled with a deliberate instructional strategy (Sinaga et al., 2026; Zh et al., 2026). The third condition is maqāṣid-referenced audit that reports formative outcomes alongside financial ones, thereby preventing the drift toward purely quantitative accountability that the Islamic education literature warns against.

Positioning these findings against the wider debate clarifies what is genuinely new. Much recent scholarship treats digitalisation as an unambiguous good for waqf institutions, emphasising transparency gains from blockchain and reach gains from mobile platforms (Awalluddin et al., 2024; Bonang et al., 2024; Setiawan & Nurzaman,

2022). The present analysis endorses those gains while inverting the relationship of interest. Technology in this framework is not primarily an instrument for improving waqf administration; it is a beneficiary category that waqf must learn to finance, with cost characteristics unlike those of the mosques, wells, and burial grounds that dominate historical endowment practice. That inversion has practical consequences, because it implies that regulators should recognise digital infrastructure as a legitimate mauqūf ‘alayh category with its own reporting conventions.

A further contribution concerns equity, which the framework treats as a design output rather than a residual concern. Meta-analytic evidence establishes that unequal device access converts educational technology into an inequality amplifier (Wang et al., 2024), and Indonesian evidence documents pronounced urban–rural disparities in connectivity that map onto madrasah distribution (Vesna, 2025). Fee-funded institutions cannot solve this problem, because raising fees to subsidise access burdens the same population the subsidy is meant to help. Endowment income breaks that circularity, since usufruct spent on connectivity subsidies imposes no cost on any current student. The third intersection of the framework, endowed access equity, therefore identifies a function that waqf performs uniquely well and that no alternative financing source performs at all.

Practical implications follow at three levels. For institutional leaders, the immediate implication is that establishing a technology-dedicated endowment corpus should precede rather than follow major platform procurement, because procurement without a maintenance income stream reliably produces stranded assets. For nazhir organisations, the implication is that investment mandates must be written to accommodate a reserve sub-fund with an explicit replacement schedule, and that reporting should distinguish capital from operational disbursement. For regulators and Islamic finance authorities, the implication is that instrument design should offer tenors matched to educational planning horizons, since sukuk maturities considerably shorter than an institution's technology roadmap create precisely the discontinuity the framework is designed to eliminate (Yumna et al., 2024).

It is instructive to contrast the proposed architecture with the secular university endowment model that Islamic institutions are sometimes urged to emulate. The two share the discipline of preserving principal and spending only income, and that shared discipline is why the comparison is frequently drawn. They diverge, however, in three respects that matter for design. Secular endowments permit the trustee wide discretion in reallocating income among purposes, whereas waqf ties income to the founder's stipulated purpose with far greater rigidity, which increases predictability at the cost of flexibility. Secular endowments typically operate under a total-return policy that permits spending from capital appreciation, whereas the classical waqf conception of corpus preservation invites a more conservative reading. Secular endowments are accountable to fiduciary standards alone, whereas waqf is accountable simultaneously to fiduciary and to sharia standards. Recognising these divergences prevents the uncritical transplantation of endowment management practice and clarifies why the reserve sub-

fund, rather than a total-return spending rule, is the appropriate mechanism for financing replacement cycles.

A plausible objection to the framework deserves direct engagement. One might argue that dedicating endowment capacity to technology diverts scarce philanthropic resources away from more urgent needs such as teacher salaries, student welfare, or the physical fabric of institutions. The objection has force, and the framework does not dismiss it. Its answer proceeds in two steps. First, the relevant comparison is not between technology and other needs but between financed and unfinanced technology, because institutions are already spending on digital provision under fiscal duress, frequently by deferring maintenance elsewhere. Second, the maqāṣid screen built into the framework is precisely the mechanism through which an institution determines whether a given technological commitment serves the objectives or merely follows fashion, and the screen may well counsel against particular investments. Far from mandating expenditure, the framework supplies criteria for declining it, and an institution applying those criteria rigorously may conclude that its endowment is better directed elsewhere in a given period.

Certain limitations bound these claims and should be acknowledged frankly. The framework is synthesised from literature rather than derived from measurement, so its constructs have not been operationalised into validated instruments and its propositions have not been tested against institutional performance data. The corpus is weighted toward Southeast Asian scholarship, which means that jurisdictions with different waqf legal traditions may require substantial adaptation, particularly where cash waqf remains juristically contested. The maturity levels in Table 4 are analytically derived rather than empirically calibrated, and the boundaries between them will require refinement through field study. These limitations are characteristic of conceptual work and are stated so that subsequent research can address them directly.

Four research directions follow naturally. Case-based investigation of institutions that have already established technology-dedicated endowments would test whether the corpus-and-reserve architecture behaves as theorised under real budgetary pressure. Survey-based measurement of the three enabling layers would permit construction of a maturity index with demonstrable reliability. Comparative work across Indonesia, Malaysia, Türkiye, and the Gulf states would establish which elements of the framework are context-invariant and which are jurisdiction-specific. Longitudinal evaluation of maqāṣid-referenced audit practice would determine whether formative reporting genuinely resists the quantitative drift the framework anticipates. Each direction converts a proposition of the present article into an empirically answerable question.

CONCLUSION

This article set out to integrate three literatures that have developed in parallel and to resolve the design problem their intersection creates. The argument yields four conclusions. (1) Waqf capital is structurally well suited to financing educational

technology in Islamic institutions, but only when the endowment is constituted by a preserved corpus whose usufruct funds expenditure, since endowing depreciating equipment directly contradicts the perpetuity requirement that defines the instrument. (2) The normative commitments of Islamic education operate most effectively as a prior screen applied at the point of financing commitment, because criteria introduced after adoption produce superficial mitigation rather than substantive alignment. (3) The Waqf–Technology–Tarbiyah framework specifies three dyadic intersections, namely sustainable financing, value-aligned mediation, and endowed access equity, which together define the conditions under which integration succeeds and the points at which it characteristically fails. (4) Integration depends on three institutional layers comprising nazhir professionalism, teacher capability, and maqāṣid-referenced audit, none of which is technological in character, which implies that the decisive constraints on digital transformation in Islamic education are organisational rather than infrastructural.

These conclusions answer the three questions that opened the inquiry. The structural properties question is answered by the distinction between endowing the corpus and endowing the asset, which converts a jurisprudential requirement into a financing advantage. The normative constraint question is answered by relocating maqāṣid evaluation from the compliance stage to the specification stage, which changes what an institution is able to purchase rather than merely how it uses what it has purchased. The governance question is answered by the corpus-and-reserve architecture together with its four control mechanisms, which together sustain accountability across successive technology generations rather than within a single procurement cycle. Each answer is stated as a proposition rather than a finding, in keeping with the conceptual character of the study.

The prospects opened by this framework extend beyond the immediate problem it addresses. Reframing digital infrastructure as an endowable public good invites Islamic educational institutions to treat technology planning as an exercise in intergenerational stewardship rather than as periodic procurement, and that reframing carries implications for how such institutions understand their own permanence. For waqf regulators, recognising technology financing as a distinct beneficiary category with its own reporting conventions would allow national endowment statistics to capture a form of provision they currently render invisible. For scholarship, the framework supplies testable propositions that convert a conceptual argument into an empirical agenda, and the four research directions identified in the discussion offer concrete starting points for that agenda. The larger prospect is an Islamic educational sector whose digital capability rests upon its own endowed resources rather than upon the fluctuating availability of external support, and whose technological choices remain answerable to the formative purposes that give the sector its reason for existing.

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