CAPABILITY BRIDGING FRAMEWORK

# HEMIS Case Study Report

*The Gambia's National Higher Education Management Information System*

**Olawale Fabiyi**
Technical Advisor, HEMIS Project
Ministry of Higher Education, Research, Science and Technology, The Gambia
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capabilitybridging.org

| 30 | 4 | 100% | 6 |
|---|---|---|---|
| Institutions Assessed | Integration Pathways | Feasibility Confirmed | Assessment Dimensions |

***This case study documents the implementation of the Capability Bridging Framework during the design phase of The Gambia's World Bank-funded Higher Education Management Information System. Institution names have been anonymised throughout. All data reflects the actual assessment findings from November and December 2025.***

# 1. Executive Summary

The Gambia's Higher Education Management Information System represents a national-scale test of whether a single open source digital platform can serve an entire higher education ecosystem where institutions operate at vastly different levels of technical capability. The answer, demonstrated through the Capability Bridging Framework, is yes.

A comprehensive integration readiness assessment conducted across 30 priority institutions between November and December 2025 found that The Gambia's higher education ecosystem spans all four integration pathways. Nine institutions, representing 30% of the assessed group, are capable of real-time API integration. Eighteen institutions, representing 60%, manage data primarily through spreadsheets and are best served by validated template-based submission. One institution operates a locally networked system. Two institutions require emergency capacity building before integration.

Critically, every single institution across all four pathway levels can be integrated within the project timeline. No institution needs to be excluded. No institution needs to wait for others to catch up. The 100% integration feasibility result across all 30 assessed institutions is the central validation of the Capability Bridging Framework's core claim: that permanent inclusion is architecturally achievable in real-world resource-constrained environments.

The HEMIS platform is currently in procurement. Technical specifications, integration architecture, and governance frameworks derived from the Capability Bridging Framework methodology have been incorporated into the procurement documentation. Bids are being evaluated.

| Project | Higher Education Management Information System (HEMIS) |
|---|---|
| **Country** | The Gambia |
| **Funding** | World Bank, RISE Initiative |
| **Client** | Ministry of Higher Education, Research, Science and Technology |
| **Architecture Standard** | TOGAF 10-compliant |
| **Assessment Period** | November to December 2025 |
| **Institutions Assessed** | 30 priority institutions covering all institutional types |
| **Current Status** | **In Procurement. Bids under evaluation.** |

# 2. Project Context

## 2.1 The Gambia's Higher Education Landscape

The Gambia is a small West African nation with a population of approximately 2.7 million. Its higher education sector is small but growing. The ecosystem includes public universities, private universities, and a range of tertiary institutes offering diploma and certificate programmes. Historically, data on higher education, student enrolment, academic staffing, programme accreditation, and institutional finances, has been collected through fragmented manual processes with no central repository and no consistent standards.

Policy decisions affecting the allocation of public funds to higher education institutions have been made on the basis of incomplete, inconsistent, and often unverifiable data. The absence of reliable national data has undermined the Ministry's ability to plan, allocate resources effectively, or respond to changing demand across the system.

## 2.2 The HEMIS Initiative

The Higher Education Management Information System was initiated under the World Bank's RISE Initiative, a programme supporting education system strengthening across selected countries. HEMIS is designed to provide the Ministry of Higher Education, Research, Science and Technology with a single, reliable, nationally consistent source of data on all higher education institutions in The Gambia.

The platform was designed to TOGAF 10 standards, applying enterprise architecture discipline to a public sector digital transformation in a resource-constrained environment. The TOGAF framework guided the architecture design process, ensuring alignment between business requirements, data architecture, technical infrastructure, and governance.

## 2.3 The Technical Advisory Role

A Technical Advisor was engaged to lead the architecture design, stakeholder engagement, integration readiness assessment, and pre-procurement technical specification. The Technical Advisor also led the development and validation of the Capability Bridging Framework, which emerged as a direct response to the integration challenge discovered during the stakeholder consultation phase.

The advisory engagement covered the full pre-procurement phase, from initial stakeholder consultation through to the completion of technical specifications and procurement

documentation. This case study documents the methodology, findings, and decisions from that engagement.

# 3. The Challenge

## 3.1 The Diversity Problem

The fundamental challenge in designing HEMIS was not technical. It was architectural. A single national platform must connect institutions operating at vastly different levels of digital capability, and do so in a way that maintains data quality, integrity, and consistency across all of them.

The Gambia's higher education ecosystem contains institutions that are polar opposites in terms of digital maturity. At one end, institutions with cloud-based ERP systems, dedicated IT departments, and staff who manage data in structured databases with consistent standards. At the other end, institutions with servers that have been non-operational for months, no formal IT support, and data management practices that are entirely paper-based.

## 3.2 The False Choice

Before the Capability Bridging Framework was developed, the standard approaches to this challenge offered two options:

- **Build for the most capable.** Design the platform to leverage the API integration capabilities of advanced institutions and accept that less-capable institutions cannot participate meaningfully. This approach delivers a sophisticated platform that serves a minority of the ecosystem and excludes the majority.
- **Simplify for everyone.** Constrain the platform to the capability level of the least-resourced institutions, ensuring universal participation but compromising the system's ability to deliver timely, high-quality data for policy decisions.

Both options were unacceptable. The first would waste public investment by building a platform that excluded the majority of institutions the Ministry needed data from. The second would produce a platform that could not support the quality of data needed for informed policy decisions.

> ***The design problem was not how to exclude less-capable institutions gracefully. It was how to include them permanently without compromising the platform for more capable institutions. The Capability Bridging Framework emerged as the answer.***

# 4. The Methodology

## 4.1 The Stakeholder Consultation

The assessment process began not with questionnaires or site visits, but with a multi-day stakeholder consultation that brought representatives from across the entire higher education ecosystem to the Ministry in Banjul. This was a deliberate design choice. Before any technical assessment took place, it was essential to surface the diversity of the ecosystem in a setting where all stakeholders could see and acknowledge it together.

Representatives from public universities, private universities, tertiary institutes, government ministries, and regulatory bodies participated. They were asked to describe their operational realities openly. What systems did they use? How did they manage data? What were their biggest constraints?

What happened in that room changed the design approach entirely. Institutions described their realities to each other for the first time. Some spoke about cloud ERPs and API readiness. Others quietly admitted they managed everything in Excel. A few acknowledged they were largely paper-based. Rather than embarrassment, there was relief. Everyone could see the diversity was real, shared, and nobody was alone in their constraints.

> ***That collective honesty became the foundation of the Capability Bridging Framework. The diversity that emerged in the consultation room was not a problem to be managed. It was the design requirement.***

## 4.2 The Field Assessment

Following the stakeholder consultation, a structured integration readiness assessment was conducted across 30 priority institutions between November and December 2025. The assessment covered all institutional types in The Gambia's higher education ecosystem: public universities, private universities, and tertiary institutes.

Each institution was assessed across six capability dimensions using the Capability Bridging Framework assessment instrument. Assessments were conducted as facilitated structured interviews with senior staff members who had operational knowledge of the institution's systems, data management practices, and governance arrangements.

- Systems infrastructure: What operational systems does the institution use?

- System accessibility: Is the system accessible over the public internet, confined to a local network, or on standalone machines?
- Digital literacy: What is the operational digital capability of data management staff?
- Data management practices: How does the institution collect, store, and share data?
- Vendor and support relationships: Who maintains the institution's systems and how active is that support?
- Governance capacity: Does the institution have formal data quality procedures and designated data stewards?

System accessibility, the second dimension, was identified as the primary determinant of pathway classification. Whether a system is publicly internet-accessible or confined to a local network determines whether API integration is architecturally possible, regardless of other capability factors.

## 4.3 Assessment Scope

| Institution Type | Institutions Assessed | Notes |
|---|---|---|
| Public Universities | **Included** | All public universities in The Gambia included |
| Private Universities | **Included** | Priority private universities with significant enrolment included |
| Tertiary Institutes | **Included** | Diploma and certificate institutions across all regions included |
| **TOTAL** | **30** | All institutional types represented across all regions |

# 5. Assessment Findings

## 5.1 Ecosystem Overview

The assessment findings confirmed the framework's design premise emphatically. The Gambia's higher education ecosystem is not uniform. It spans the full spectrum of digital capability, from institutions operating sophisticated cloud-based ERP systems to institutions with non-operational servers and paper-based operations. Every level of the Capability Bridging Framework is represented.

## 5.2 Pathway Distribution

The 30 assessed institutions were classified across the four integration pathways as follows:

| | | | |
|---|---|---|---|
| L1 | 9 institutions | 30% | **Online Systems Pathway** Institutions with cloud or web-based ERP systems ready for real-time API integration. Includes institutions with dedicated IT capacity and active vendor support contracts. |
| L2 | 1 institutions | 3% | **Local Network Systems Pathway** One institution operating a LAN-based ERP system. The system is functional and well-maintained but not accessible over the public internet. Requires scheduled bulk export mechanism. |
| L3 | 18 institutions | 60% | **Structured Data Pathway** The majority of assessed institutions. Managing data primarily through Excel or Access. Some have structured practices, others are inconsistent. All can contribute via validated template upload. |
| L4 | 2 institutions | 7% | **Assisted Entry Pathway** Two institutions requiring emergency intervention before integration. One had servers completely non-operational at the time of assessment. Both required capacity building before any integration pathway could be maintained independently. |

## 5.3 Cross-Dimensional Findings

Beyond the pathway classifications, the assessment revealed consistent patterns across all six dimensions that have material implications for the implementation approach:

- **Systems infrastructure.** The majority of institutions operate commercially licensed software systems that are several years old. System age alone does not determine

pathway classification, but older systems combined with lapsed vendor support contracts creates a sustainability risk that the framework must account for.

- **Digital literacy.** Digital literacy varies significantly even within pathway levels. Several Level 3 institutions have individual staff members with advanced digital capability alongside colleagues with basic skills. The framework's design must account for this internal variation, not just institution-level classification.

- **Data management practices.** Every institution assessed had some form of data quality gap. No institution had fully documented, consistently applied data quality procedures. This finding shaped the data quality workshop programme developed as part of the implementation plan.

- **Vendor relationships.** Several institutions, including some classified at Level 1, had lapsed vendor support contracts. This represents a significant sustainability risk. An institution with an API-capable system but no vendor support may find themselves unable to maintain that capability within the implementation timeline.

- **Governance capacity.** No institution across the entire 30 assessed had formal, documented data quality procedures in place at the time of assessment. This was the most consistent finding across the ecosystem and the most significant data quality risk identified.

## 5.4 The Economic Reality Finding

One finding from the assessment was not anticipated by the framework design but has material implications for how pathway classification is applied in practice. Several institutions assessed as Level 1 capable, with cloud-based systems fully capable of API integration, indicated during the assessment that they were unlikely to pursue API development because of cost.

API development requires engaging a developer or vendor. For institutions operating on tight budget cycles with technology budgets that are not guaranteed year on year, the cost of API development and maintenance exceeded what they could commit to within the integration timeline.

These institutions expressed a preference for Level 3 submission, which requires no additional technology investment beyond what they already have. The framework accommodated this preference without penalty. Pathway classification was recorded as Level 1 capable, and the chosen pathway was recorded as Level 3. The distinction between capability and choice is now formally incorporated into the framework as a core principle.

# 6. Implementation Decisions

## 6.1 The Modular Architecture Decision

The assessment findings made clear that a monolithic integration architecture could not serve four pathway levels without accumulating significant technical debt. Each pathway introduces different data formats, validation logic, processing schedules, and error handling requirements.

The architectural decision made for HEMIS was a modular microservices design where each integration pathway operates as an independent module with its own validation engine, error handling, and submission processing logic. A common data layer enforces identical quality standards across all four modules. The HEMIS core platform consumes clean, validated data regardless of which pathway produced it.

- Each pathway module can be updated, patched, or replaced without affecting other pathways.
- New pathways can be added in future without modifying existing pathway logic.
- Performance optimisation can be applied per pathway based on usage patterns.
- Pathway-specific bugs are isolated and do not cascade across the platform.

## 6.2 The Language Decision

One of the most consequential implementation decisions was not technical. It was linguistic.

When the framework was first presented to stakeholders using the term capability tiers, the response was immediate resistance. Institutions perceived tier classification as a judgment on their adequacy. A public university that had operated for decades did not want to be told it was in Tier 4. The framing undermined the collaborative spirit the consultation had built.

The framework was reframed. Tiers became pathways. The language shifted from hierarchy to direction, from judgment to choice. An institution is not in a lower tier. It operates on a different pathway, one that reflects its current operational reality and offers a clear direction toward advancement if it chooses to pursue it.

> ***The same technical classification system, described as integration pathways rather than capability tiers, achieved substantially higher institutional buy-in. This is not a communications observation. It reflects a genuine principle of inclusive design: framing must honour the dignity of every participant.***

## 6.3 The Governance Design Decision

The technical challenge of building four integration pathways was less complex than the governance challenge that followed it. How do you maintain a single authoritative source of truth when data arrives continuously from one institution and monthly from another? What happens when the two submissions for the same data element carry different values?

Three governance mechanisms were designed and documented as part of the HEMIS pre-procurement framework:

- **Authoritative source designation.** Every data element in HEMIS has a documented primary source. When conflicting data arrives, the designated authoritative source wins without requiring human intervention for every case.
- **Time-stamped versioning.** Every submission from every pathway is logged with a timestamp, source identifier, data period, and version number. Full audit trail. Always traceable.
- **Conflict resolution protocol.** When conflicting submissions are detected, the conflict is flagged automatically, routed to a designated data steward, and must be resolved within a defined timeframe with the resolution recorded against both submissions.

Designing these governance rules took longer than the technical integration work. Getting all 30 institutions to agree to and sign off on the authoritative source designation document before the procurement specification was finalised was one of the most time-consuming and most important activities of the pre-procurement phase.

# 7. Key Lessons

Three lessons from the HEMIS implementation have material implications for any future deployment of the Capability Bridging Framework. These are not theoretical observations. They emerged from direct experience in the field and changed how the framework was applied.

LESSON 01

## Language determines reception. One word changed everything.

When the framework was first presented using the term capability tiers, institutions resisted immediately. Being placed in a tier felt like a judgment on their adequacy. A public university that had operated for decades perceived Tier 4 classification as a public declaration of institutional failure.

Reframing the levels as integration pathways resolved this resistance completely. A pathway implies movement, choice, and direction rather than a fixed hierarchy. The same framework, described differently, achieved substantially higher institutional buy-in across all 30 assessed institutions.

***"A tier implies a hierarchy you are stuck in. A pathway implies movement, choice, and direction. Words matter more than architecture in stakeholder engagement."***

LESSON 02

## Governance is harder than integration. Who owns the truth?

The technical challenge of building four integration pathways was less complex than the governance challenge of maintaining a single authoritative source of truth when data arrives continuously from one stakeholder and monthly from another.

The governance design work, authoritative source designation, versioning rules, and conflict resolution protocols, took longer than the technical integration design. Getting all institutions to agree to these rules before procurement was finalised required multiple workshops, bilateral conversations, and careful negotiation around data element ownership.

***"Get governance agreement from all stakeholders before a single line of integration code is written. Retrospective governance agreement is significantly harder to achieve and less reliable than pre-launch agreement."***

LESSON 03

## Capability and choice are not the same thing. Economics overrides technology.

Several institutions assessed as Level 1 capable chose to operate at Level 3 for economic reasons. API development and maintenance carries a cost that some organisations could not absorb within their budget cycles. Their vendor quoted a development price that did not fit within the institution's annual technology budget.

The framework accommodated this without penalty. Pathway selection was recorded as Level 3 for these institutions with a note that their technical capability supports Level 1. This finding led directly to the addition of Financial Sustainability as a seventh assessment dimension in the Capability Bridging Framework methodology.

***"Technical capability is what an organisation can do. Pathway choice reflects what they can actually sustain. The framework must respect both."***

# 8. The Governance Approach in Practice

## 8.1 Authoritative Source Designation in HEMIS

The authoritative source designation process for HEMIS involved a full-day governance workshop attended by representatives from all 30 assessed institutions and the Ministry. Each data element in the HEMIS data model was reviewed and a primary source was designated through a facilitated discussion process.

The most contested designations involved data elements where both institutions and the Ministry collected the same data through different mechanisms. Student enrolment figures, for example, were collected by institutions through their own management systems and by the Ministry through its annual survey. The two sources frequently produced different numbers due to definitional differences, with the Ministry survey capturing only formally registered students while institutional systems included students in provisional registration.

The resolution was to designate the institutional submission as authoritative for current-year enrolment data, with the Ministry survey retained as a validation reference rather than an overriding source. This decision required the Ministry to accept that its own annual survey might be superseded by institutional submissions in the HEMIS platform, which was a significant governance concession that took considerable discussion to reach.

## 8.2 Versioning Across Pathways

The versioning challenge in HEMIS was compounded by the frequency difference between pathways. Level 1 institutions submit data in real time. Level 3 institutions submit monthly. Level 4 institutions submit quarterly at best. The platform must maintain a coherent current state despite receiving updates at these very different frequencies.

The adopted approach was to treat each submission as a timestamped snapshot with a designated data period. The current state of any data element for any institution is always the most recent submission for that data period, regardless of when it was submitted. A Level 3 institution submitting monthly data is never overridden by a Level 1 institution submitting in real time, unless the Level 1 institution is the designated authoritative source for that specific data element.

## 8.3 Data Quality Baseline

The assessment confirmed that no institution across the 30 assessed had formal, documented data quality procedures. This finding was not surprising but was important to document explicitly, because it shaped the data quality programme developed as part of the implementation plan.

A data quality workshop programme was designed to be delivered before the first HEMIS submission cycle. The programme is differentiated by pathway level. Level 1 and Level 2 institutions receive training focused on API error handling and validation response interpretation. Level 3 institutions receive hands-on template training with worked examples of common validation errors. Level 4 institutions receive portal navigation training and guidance on paper-to-digital transcription accuracy.

# 9. Outcomes and Current Status

## 9.1 Pre-Procurement Phase Outcomes

The Capability Bridging Framework guided the complete pre-procurement phase of the HEMIS implementation. The following outcomes were achieved:

- Integration readiness assessments completed across all 30 priority institutions.
- Pathway classifications assigned and validated with all institutions.
- Authoritative source designation agreed and signed by all stakeholders.
- Time-stamped versioning logic documented and incorporated into technical specifications.
- Conflict resolution protocol designed and agreed with all stakeholders.
- Data quality workshop programme designed and ready for delivery.
- Technical specifications incorporating the four-pathway architecture submitted to the procurement process.
- Integration readiness findings used to inform vendor evaluation criteria.

## 9.2 The Central Result

The single most important outcome of the pre-procurement phase is that 100% integration feasibility was confirmed across all 30 assessed institutions. Every institution, regardless of their capability level, can be integrated into the HEMIS national platform within the project timeline using the appropriate pathway mechanism.

> ***No institution was excluded. No institution was asked to wait while others caught up. The 100% integration feasibility result is the definitive validation of the Capability Bridging Framework's central claim: that permanent inclusion is architecturally achievable even in resource-constrained environments with extreme stakeholder diversity.***

## 9.3 Project Timeline

| Phase | Period | Key Activities | Status |
|---|---|---|---|
| **Stakeholder Consultation** | Mid 2025 | Multi-day consultation. Ecosystem diversity surfaced. CBF concept developed. | Complete |
| **Integration Readiness Assessment** | Nov – Dec 2025 | 30 institutions assessed. Pathway classifications assigned. Findings documented. | Complete |
| **Governance Design** | Dec 2025 – Jan 2026 | Authoritative source designation. Versioning logic. Conflict resolution protocol. | Complete |
| **Technical Specifications** | Jan – Feb 2026 | Four-pathway architecture specified. Vendor evaluation criteria developed. | Complete |
| **Procurement** | 2026 | Bids submitted and under evaluation by the Ministry and World Bank. | In Progress |
| **Implementation** | Post-Procurement | Vendor onboarding. Platform development. Data quality workshops. Go-live. | Pending |

# 10. Transferability

## 10.1 Beyond Higher Education

The Capability Bridging Framework was developed in a higher education context but addresses a universal challenge. Any national or cross-organisational system that must serve stakeholders with unequal technical capabilities faces the same design problem that HEMIS faced.

The assessment findings from HEMIS, extreme diversity across a single ecosystem, the economic reality of pathway choice, the governance complexity of multi-frequency data flows, and the universal absence of formal data quality procedures, are not unique to The Gambia's higher education sector. They are consistent with the conditions found in public sector digital transformation across the developing world.

## 10.2 Sectors with Immediate Applicability

- Healthcare: National health reporting systems connecting tertiary hospitals, district clinics, and rural health posts across the full capability spectrum.
- Agriculture: Data collection platforms serving commercial farms with sophisticated management systems alongside smallholder cooperatives with paper records.
- Municipal government: Service delivery reporting covering urban centres with enterprise platforms and remote communities with paper-based operations.
- Tax administration: Compliance reporting serving multinationals with integrated ERP systems alongside informal sector operators with no financial records.

## 10.3 What Transfers Without Modification

- The four pathway structure and the principles of permanent inclusion and identical quality standards.
- The seven-dimension assessment methodology across two categories.
- The governance approach, authoritative source designation, versioning, and conflict resolution.
- The three implementation lessons on language, governance complexity, and economic reality.

## 10.4 What Requires Contextual Adaptation

- The specific data elements and their authoritative source designations, which are sector-specific.
- The validation rules within each pathway, which reflect sector-specific data standards.
- The assessment question wording, which should use sector-appropriate terminology.
- The facilitated entry model for Level 4 organisations, which depends on sector-specific support infrastructure.

> ***If the stakeholders a system must serve do not have uniform technical capabilities, the system's architecture should not assume that they do. This principle applies equally in education, healthcare, agriculture, municipal government, and tax administration.***

**Suggested Citation**

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**Contact:** fabiyiolawale@gmail.com

**Framework:** capabilitybridging.org