

Towards Inclusive Knowledge Organizational Systems for Multilingual Communities and Conceptual Models in Federal Universities Libraries in Nigeria

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ABSTRACT

Knowledge organization systems (KOS)—including classification schemes, subject heading lists, thesauri, and metadata frameworks—remain predominantly monolingual and shaped by epistemological traditions developed in Anglo-American and European contexts, posing significant access barriers for multilingual communities served by academic libraries in linguistically diverse nations such as Nigeria. This paper examines the conceptual and practical challenges of designing inclusive KOS for multilingual users within Nigerian higher education institutions, where English serves as the official language of instruction alongside numerous indigenous languages spoken by students, researchers, and host communities. Drawing on the literature on classification theory, multilingual subject access, indigenous knowledge organization, international library policy instruments, and the technological context of Nigerian academic libraries, this paper proposes a layered conceptual model—the Inclusive Multilingual Knowledge Organization (IMKO) framework—that integrates terminology mapping, parallel vocabularies, community-informed indexing, and adaptive metadata layers within existing library systems. The framework is examined against the operational realities of a composite Nigerian academic library, including its predominant reliance on the Koha open-source integrated library system (ILS), highlighting infrastructural, financial, and human-resource considerations documented in prior research. The paper concludes with recommendations for library and information science education, professional bodies, and policy actors—including the National Universities Commission and the Tertiary Education Trust Fund—to support the gradual adoption of more linguistically inclusive cataloguing and classification practices.

Keywords: knowledge organization systems; multilingualism; academic libraries; Nigeria; subject access; inclusive cataloguing; indigenous knowledge; Koha

INTRODUCTION

Libraries function as gateways to recorded knowledge, yet the systems used to organize and provide access to that knowledge are rarely neutral. Knowledge organization systems (KOS) comprising classification schemes such as the Dewey Decimal Classification (DDC) and the Library of Congress Classification (LCC), controlled vocabularies such as the Library of Congress Subject Headings (LCSH), and metadata standards such as MARC21 were developed primarily within Anglo-American and European library traditions. Even the most influential alternative to these enumerative schemes, S. R. Ranganathan's faceted Colon Classification, emerged from and reflected a specific cultural and intellectual context, illustrating that all classification systems, however systematic, are products of the worldviews of their creators (Andrade & Albuquerque, 2017).

A substantial body of cataloguing and classification scholarship has documented how DDC and LCC encode particular cultural and racial assumptions that persist in present-day library practice. Olson (2002) provided an early and influential account of how subject representation in mainstream classification systems systematically marginalizes the materials and perspectives of non-dominant groups. Subsequent empirical work has reinforced this picture: large-scale analysis of library classification data found that DDC exhibits a greater degree of

Western and religious bias than LCC, with categories related to religion showing particularly strong skew (Howard & Knowlton, 2018). Historical analysis of DDC across multiple editions has traced how nineteenth-century racial categorizations became embedded in the scheme and have persisted, in modified form, for over a century (Thornton, 2024). Most directly relevant to the present discussion, Mossop (2004) examined the treatment of non-Western languages and literatures within DDC's 400 and 800 classes and concluded that African languages and literatures are given disproportionately little structural space, reflecting a scheme built around the shape of the nineteenth-century North American academic world rather than the linguistic realities of the communities many libraries now serve.

Nigeria, like much of sub-Saharan Africa, presents a markedly different linguistic landscape from the contexts in which DDC and LCC were developed. With English serving as the official language of government, education, and most formal record-keeping alongside hundreds of indigenous languages, Nigerian libraries are increasingly recognized as needing deliberate strategies to integrate indigenous languages and cultural content into their systems yet a persistent lack of cataloguing tools, metadata standards, and digitization frameworks that support indigenous languages continues to limit such integration (Obot & Kolawole, 2025). This is despite long-standing international guidance: the IFLA/UNESCO Multicultural Library Manifesto frames culturally and linguistically responsive service as a core, not supplementary, library function (International Federation of Library Associations and Institutions [IFLA], 2008), and UNESCO's Recommendation concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace explicitly calls on member states to support the development of multilingual terminologies and information systems, including for indigenous languages (UNESCO, 2003).

Despite this international normative framework, the knowledge organization systems used in Nigerian academic libraries remain almost uniformly monolingual, built on classification and subject-heading traditions developed for Anglo-American institutional contexts. This creates a structural mismatch: students and researchers whose first languages are Nigerian languages, and whose communities hold rich bodies of indigenous knowledge, find that library catalogues offer no meaningful entry points in those languages, and that locally relevant materials where they exist in collections are often poorly described or effectively invisible to searches. International precedents exist for multilingual subject-access alignment, such as the Multilingual Access to Subjects (MACS) project linking subject headings across French, German, and English catalogues (Doerr, 2001), and for culturally responsive classification, such as the Brian Deer Classification System used in Indigenous libraries in North America (Cherry & Mukunda, 2015) and the Mashantucket Pequot Thesaurus of American Indian Terminology developed to support Indigenous-perspective subject access (Littletree & Metoyer, 2015). However, no widely adopted framework currently addresses how Nigerian academic libraries operating under significant resource constraints and largely on the Koha platform might incrementally build multilingual access into their existing systems.

This paper argues that inclusive knowledge organization is not merely a technical or cataloguing concern but a matter of equitable information access and cognitive justice the principle that subject access systems should allow communities to engage with recorded knowledge on terms consistent with their own worldview, rather than only through frameworks imported from elsewhere (Webster, 2017). What is missing from the literature is a framework that translates this principle into a concrete, incremental implementation pathway suited to the specific technical and resource environment of Nigerian academic libraries, the large majority of which now run on the Koha open-source platform. This paper develops such a framework the Inclusive Multilingual Knowledge Organization (IMKO) model and examines its application to a composite Nigerian academic library, drawing on classification theory, indigenous knowledge organization scholarship, and the documented realities of Koha-based library automation in Nigeria.

Objectives of the Study

This study is guided by three research questions:

1. Examine the limitations of conventional knowledge organization systems in supporting multilingual access and indigenous knowledge representation in Nigerian university libraries.

2. Analyze the conceptual and institutional factors influencing the development of inclusive multilingual knowledge organization systems in Nigerian university libraries.
3. Develop a framework for implementing inclusive multilingual knowledge organization systems that enhance equitable information access in Nigerian university libraries.

The paper makes three principal contributions. First, it synthesizes evidence on the structural, terminological, and representational barriers embedded within conventional knowledge organization systems that constrain multilingual information access in Nigerian university libraries. Second, it introduces the Inclusive Multilingual Knowledge Organization (IMKO) framework as a scalable and context-sensitive model for embedding multilingual subject access and indigenous knowledge representation within existing library infrastructures. Third, it provides a phased implementation roadmap tailored to the predominantly Koha-based Nigerian academic library ecosystem, linking international multilingual knowledge organization practices with local institutional realities and policy priorities.

LITERATURE REVIEW

Classification Theory and the Limits of Universal Schemes

Classification theory has long grappled with the tension between universal, enumerative schemes such as DDC and LCC, and more flexible, analytico-synthetic approaches. Ranganathan's Colon Classification, first published in 1933, introduced facet analysis as an alternative to enumerative classification, organizing subjects according to five fundamental categories Personality, Matter, Energy, Space, and Time (PMEST) that could be combined synthetically to represent complex, multidimensional subjects (Andrade & Albuquerque, 2017). While the Colon Classification itself has seen limited adoption outside India, its underlying insight that subjects can be represented more accurately through flexible combination of facets than through fixed enumerative categories—has influenced subsequent classification theory and remains relevant to discussions of how local and supplementary access points might be layered onto existing schemes (Andrade & Albuquerque, 2017).

Critiques of enumerative classification have focused particularly on DDC and LCC's treatment of non-dominant groups and non-Western subject matter. Olson (2002) argued that subject representation in mainstream classification systems is structured around a limited set of culturally specific assumptions about what constitutes a 'main' versus 'marginal' topic, with consequences for how materials about non-dominant cultures, races, and languages are organized and discovered. Howard and Knowlton (2018) provided empirical support for this critique at scale, analyzing a large library dataset and finding that DDC exhibits greater bias toward Western and Christian-centric categorization than LCC, particularly in religion-related categories. Thornton (2024) extended this analysis historically, tracing how nineteenth-century theories of race and ethnicity became embedded in DDC's structure and have persisted, in modified form, across multiple editions over more than a century.

Most directly relevant to the present study, Mossop (2004) examined DDC's treatment of non-Western languages and literatures within classes 400 (Language) and 800 (Literature), concluding that African languages and literatures receive disproportionately little structural space and that, while local and official revisions have been attempted, more systemic effort is needed—potentially including new models for adapting DDC at the national level. This finding is foundational to the present paper's argument that supplementary, locally developed access layers—rather than waiting for revision of DDC itself offer the most immediately viable path for Nigerian academic libraries.

Locally Developed Classification and Subject Heading Systems

Examples of locally developed knowledge organization systems demonstrate the feasibility of supplementing, rather than replacing, mainstream classification. The Brian Deer Classification System (BDCS), originally developed in the 1970s for the National Indian Brotherhood's research collection in Canada, was designed specifically to reflect Indigenous worldviews and the structure of Indigenous knowledge, and has since been revised and adapted by multiple institutions for their own collections (Cherry & Mukunda, 2015). One of its

defining strengths is its flexibility: rather than imposing a single universal structure, it is designed to be reworked for each community and collection it serves (Cherry & Mukunda, 2015).

A complementary approach is illustrated by the Mashantucket Pequot Thesaurus of American Indian Terminology, developed to provide subject access to materials about Indigenous peoples using terminology and conceptual groupings consistent with Indigenous perspectives, while functioning as a controlled vocabulary that can be mapped to or used alongside standard subject heading systems (Littletree & Metoyer, 2015). Similarly, the Library at the University of British Columbia uses a locally developed classification and subject heading system including First Nations House of Learning subject headings while remaining integrated with, and discoverable through, the broader university library catalogue. This dual structure a locally meaningful access layer integrated with a mainstream catalogue illustrates that inclusive knowledge organization need not come at the cost of interoperability, a balance that is directly relevant to the framework proposed in Section 4.

Multilingual Subject Access: International Precedents

Outside the indigenous-knowledge literature, the principal precedent for multilingual access is concept-based subject heading alignment. The Multilingual Access to Subjects (MACS) project linked subject headings used in French, German, and English national library catalogues, allowing users to search using subject terms in their own language while retrieving results catalogued under equivalent headings in other languages (Doerr, 2001). Crucially, MACS did not require any single library to abandon its existing subject heading language; it functioned as a cross-reference layer connecting independently maintained vocabularies. This concept-hub approach linking equivalent terms across languages without restructuring the underlying vocabularies offers a directly transferable model for the Parallel Access Vocabulary layer proposed in Section 4.

At the policy level, IFLA's Multicultural Communities: Guidelines for Library Services frame culturally and linguistically diverse collections and services as a core, integrated function of every library, not a separate or additional service, and call for cataloguing of materials in their original language wherever practicable, alongside collections that reflect the languages and scripts of the communities served (IFLA, 2008). The IFLA/UNESCO Multicultural Library Manifesto reinforces this position, explicitly identifying the development of multilingual collections and services and the preservation of oral, indigenous, and intangible cultural heritage as core library responsibilities (IFLA, 2008). At a broader policy level, UNESCO's 2003 Recommendation concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace calls on member states and international organizations to support the development of multilingual terminologies, online dictionaries, and information systems with extensive multilingual capabilities, including for indigenous languages (UNESCO, 2003). These instruments provide normative backing for the kind of incremental, locally developed multilingual access infrastructure proposed in this paper, even though their implementation in Nigerian academic library cataloguing practice remains limited.

Indigenous Knowledge, Libraries, and Digital Preservation in Africa

A growing body of African LIS scholarship has examined the role of libraries in preserving and providing access to indigenous knowledge, much of which exists in oral rather than written form. Chigwada and Ngulube (2024) conducted a qualitative study of librarians in Zimbabwe and found that libraries preserve indigenous knowledge in forms including poetry, folklore, drama, and recorded oral performances, but that librarians face significant ethical challenges in documenting such knowledge particularly around consent, attribution, and the appropriate format for different types of knowledge. Complementary work examining South Africa's National Recorded System found that digitization is widely seen as essential to preventing the loss of indigenous knowledge, but that digitization efforts across the region have often been constrained by inadequate funding and infrastructure (Adei et al., 2023).

Within Nigeria specifically, Obot and Kolawole (2025) argue that Nigerian libraries generally lack guidelines or policies for the ethical digitization and governance of cultural and indigenous-language materials, and that the absence of indigenous-language integration into information and communication technology (ICT) platforms limits both access and the preservation of linguistic diversity. Their study recommends investment in ICT,

digitization of indigenous knowledge materials, staff development, and stronger alignment with national cultural policy as strategies for strengthening Nigerian libraries as culturally responsive institutions (Obot & Kolawole, 2025). Earlier Nigerian LIS scholarship had similarly argued that information and communication technologies offer libraries an important means of capturing and preserving oral indigenous knowledge through audio and video recording, digital photography, and related methods though the successful application of these tools depends on the availability of appropriate equipment and trained personnel (Onyemaizu, 2016, as cited in Middlebelt Journal of Library and Information Science, 2016).

At the national level, the National Library of Nigeria has signalled engagement with international language-preservation efforts, with its National Librarian serving on the steering committee for the International Decade of Indigenous Languages (National Library of Nigeria, n.d.). This indicates institutional awareness of indigenous-language preservation as a policy priority, even where implementation at the level of individual academic library catalogues remains limited.

Integrated Library Systems in Nigerian Academic Libraries: The Case of Koha

Any proposal for multilingual access enhancements in Nigerian academic libraries must account for the technical infrastructure on which most libraries operate. A substantial body of survey-based research indicates that Koha, an open-source integrated library system, is the integrated library system most widely adopted in Nigerian academic libraries, owing to its cost-effectiveness, flexibility, and the support of an active global developer community (Jamogha, 2022). A nationwide survey of libraries that had adopted Koha as of 2021 found it most prevalent among libraries in the South-West geopolitical zone, with adopting institutions citing the software's free availability, customizability, and continuous upgrades as key factors, while identifying the lack of skills and proper staff training as the main challenge to fuller use of Koha's modules (Adeyemi, 2019).

Complementary survey work focused on librarians in universities in Southern Nigeria found that Koha was perceived as highly useful for acquisition, cataloguing, circulation, and serials operations, with perceived usefulness positively influencing adoption; however, the same study found only moderate overall adoption, with inadequate staff training identified as a major barrier, and recommended regular, structured training as a precondition for libraries to realize Koha's full potential (Jamogha et al., 2022). These findings—cost-effectiveness and flexibility on one hand, and persistent training and capacity gaps on the other—directly inform the phased, low-technical-overhead implementation pathway proposed in Section 5.

Synthesis and Research Gap

Taken together, the literature establishes several things clearly. First, classification theory itself has long recognized that no scheme is culturally neutral; even alternatives to enumerative classification, such as Ranganathan's facet analysis, emerged from particular cultural contexts (Andrade & Albuquerque, 2017). Second, empirical and historical analyses of DDC and LCC document specific, persistent biases against non-dominant cultures, races, and most relevant here non-Western languages and literatures (Howard & Knowlton, 2018; Mossop, 2004; Olson, 2002; Thornton, 2024). Third, both locally developed classification and thesaurus systems (e.g., the Brian Deer Classification System, the Mashantucket Pequot Thesaurus) and concept-based multilingual alignment approaches (e.g., MACS) offer viable, tested models for addressing these biases without requiring wholesale replacement of mainstream systems, and these approaches are consistent with international normative guidance from IFLA and UNESCO (Cherry & Mukunda, 2015; Doerr, 2001; IFLA, 2008; Littletree & Metoyer, 2015; UNESCO, 2003).

Fourth, African and Nigerian LIS scholarship has documented both the importance and the difficulty of integrating indigenous knowledge into formal library systems, citing ethical, infrastructural, and policy gaps (Adei et al., 2023; Chigwada & Ngulube, 2024; Obot & Kolawole, 2025). Fifth, Nigerian academic libraries operate within a fairly homogeneous technical environment dominated by Koha, with well-documented capacity constraints around staff training and technical expertise (Adeyemi, 2019; Jamogha et al., 2022). What remains absent is a framework that connects these strands—translating the lessons of classification critique, indigenous knowledge organization, and multilingual subject-access alignment into a pathway specifically suited to the

Koha-based, resource-constrained environment of Nigerian academic libraries. The IMKO framework proposed in Section 4 is intended to fill that gap.

Multilingual Communities and the Limits of Conventional KOS

Within a typical Nigerian academic library, three categories of access barriers can be identified: terminological, structural/conceptual, and representational. Table 1 summarizes these barriers alongside illustrative manifestations and their consequences for multilingual users.

Terminological Barriers

Subject headings and index terms are constructed in English, often using terminology drawn from international standard lists such as LCSH. Concepts that have well-established local-language names plant species, traditional practices, local governance structures, place names—may be catalogued only under their English or scientific equivalents, if at all. A user searching using a familiar local term will retrieve no results, not because the material does not exist, but because the access point does not exist. This pattern echoes findings from the MACS project, which was developed precisely because catalogue users searching in their own language could not retrieve materials catalogued under equivalent terms in another (Doerr, 2001), and reflects Mossop's (2004) broader finding that African languages occupy disproportionately little structural space within DDC.

Structural/Conceptual Barriers

Beyond individual terms, the broader conceptual organization of knowledge in classification schemes may not correspond to local ways of grouping related ideas. Cherry and Mukunda (2015) describe how, under conventional schemes, an interconnected body of indigenous knowledge spanning practical, spiritual, and governance dimensions may be fragmented across distant, disconnected classification numbers, obscuring relationships that would be self-evident to community members and complicating browsing-based discovery. Olson (2002) similarly argued that the placement of subjects within a classification hierarchy is itself an act of interpretation, one that can misrepresent how a community understands the relationships among its own bodies of knowledge.

Representational Barriers

Even where local-language materials are held in the collection—theses, oral history recordings, community documentation projects—catalogue records frequently describe them only in English, with no indication of the language(s) of content, no transliteration guidance, and no metadata fields capturing dialectal or regional variation. Obot and Kolawole (2025) note that the absence of cataloguing tools and metadata standards supporting indigenous languages is a direct barrier to integrating such materials into Nigerian library systems, effectively rendering them invisible to searches conducted in or about those languages. This is compounded for oral-format materials: as Chigwada and Ngulube (2024) note, recorded oral knowledge requires its own descriptive conventions if it is to be discoverable alongside textual materials.

Table 1. Access Barriers in Conventional KOS for Multilingual Library Users

Barrier Type	Illustrative Manifestation	Consequence for Multilingual Users
Terminological	Subject headings exist only in English; local-language terms for plants, practices, or places have no catalogue entry point	Searches using local-language terms return no results, even where relevant materials exist

Structural/Conceptual	Related indigenous knowledge (e.g., agriculture, belief, governance) dispersed across distant DDC numbers	Browsing fails to surface conceptually related materials; local knowledge groupings are obscured
Representational	Catalogue records for local-language or oral materials lack language/script metadata or descriptive conventions for oral formats	Local-language and oral holdings become invisible to language-based or content-based searches

Note. Compiled by the author based on Doerr (2001), Mossop (2004), Cherry and Mukunda (2015), Chigwada and Ngulube (2024), and Obot and Kolawole (2025).

The Inclusive Multilingual Knowledge Organization (IMKO) Framework

The IMKO framework is proposed as a layered, additive approach designed to be implemented incrementally atop existing classification and cataloguing infrastructures, rather than as a replacement system. It comprises four interrelated layers, each addressing one of the barrier types identified in Section 3.

Layer 1: Parallel Access Vocabulary (PAV)

The PAV layer addresses terminological barriers by developing a supplementary, locally curated vocabulary list that maps commonly used local-language terms to existing subject headings and classification numbers. Rather than replacing LCSH or DDC, the PAV functions as a bridge: a searchable cross-reference table linking a Nigerian-language term to its corresponding English subject heading. This mirrors, at institutional scale, the cross-language linking approach of the MACS project, in which independently maintained vocabularies were connected through equivalence mappings without requiring any one system to be restructured (Doerr, 2001), and reflects the facet-based logic of treating local terminology as an additional, combinable access dimension rather than a replacement for existing notation (Andrade & Albuquerque, 2017). The PAV can be implemented as a supplementary authority file within Koha, populated incrementally through community consultation, student input, and subject-specialist review.

Layer 2: Community-Informed Indexing (CII)

The CII layer addresses structural/conceptual barriers by introducing optional, additional subject access points derived from community knowledge structures, particularly for special collections, theses on indigenous knowledge systems, and local history materials. This involves working with departmental experts, local-language scholars, and community informants to identify groupings and relationships that reflect how knowledge is locally organized, then encoding these as supplementary subject terms or local classification notations attached to relevant records—an approach directly informed by the community-driven, flexible design philosophy underlying the Brian Deer Classification System (Cherry & Mukunda, 2015), the Mashantucket Pequot Thesaurus (Littletree & Metoyer, 2015). Consistent with the ethical concerns raised by Chigwada and Ngulube (2024), CII work involving community-held knowledge should be guided by clear protocols on consent and attribution.

Layer 3: Linguistic Metadata Enrichment (LME)

The LME layer addresses representational barriers, ensuring that catalogue records for local-language and oral materials include accurate language and script metadata (using ISO 639 language codes), notes on dialectal variation, and, where relevant, transliteration or romanization guidance and descriptive conventions for recorded oral content. This responds directly to the gaps identified by Obot and Kolawole (2025) and Chigwada and Ngulube (2024) regarding the absence of metadata standards supporting indigenous languages and oral materials in Nigerian and African libraries more broadly, and is largely a matter of cataloguing practice and staff training

rather than new technical infrastructure, implementable through updated cataloguing guidelines and consistent use of relevant MARC fields (e.g., 041 and 546).

Layer 4: Adaptive Discovery Interface (ADI)

The ADI layer concerns the public-facing catalogue/OPAC. Where Koha's search and indexing configuration permits, the discovery interface can surface PAV cross-references directly to users for example, suggesting mappings between local-language search terms and the controlled vocabulary, or allowing users to filter by language of content.

Given that Koha is the integrated library system most widely adopted in Nigerian academic libraries (Jamogha et al., 2022), and that staff training rather than software cost has been identified as the principal constraint on fuller use of Koha's capabilities (Adeyemi, 2019), Layer 4 is framed as a configuration and training challenge to be addressed collaboratively across the Nigerian Koha-user community rather than as a software acquisition challenge.

Table 2 summarizes the four layers, the barrier each addresses, the core implementation activity, and the primary resource requirement.

Table 2. The IMKO Framework: Layers, Functions, and Resource Requirements

Layer	Barrier Addressed	Core Activity	Primary Resource Need
1. Parallel Access Vocabulary (PAV)	Terminological	Build and maintain a term-mapping authority file linking local-language terms to controlled vocabulary	Community/staff input; periodic review
2. Community-Informed Indexing (CII)	Structural/Conceptual	Add supplementary subject terms reflecting local knowledge groupings to relevant records	Subject specialists; community informants
3. Linguistic Metadata Enrichment (LME)	Representational	Apply language/script/oral-format metadata (ISO 639; MARC 041/546) to records	Cataloguing staff training
4. Adaptive Discovery Interface (ADI)	All three (user-facing)	Configure OPAC search/filter behaviour to surface PAV mappings	Koha configuration and staff training

To make the internal mechanics of the framework concrete, Figure 1 presents a schematic of how data moves through the four IMKO layers and into Koha's existing bibliographic and authority infrastructure, culminating in the OPAC discovery experience.

Figure 1. IMKO Layer Architecture and Multilingual Data Flow within Koha

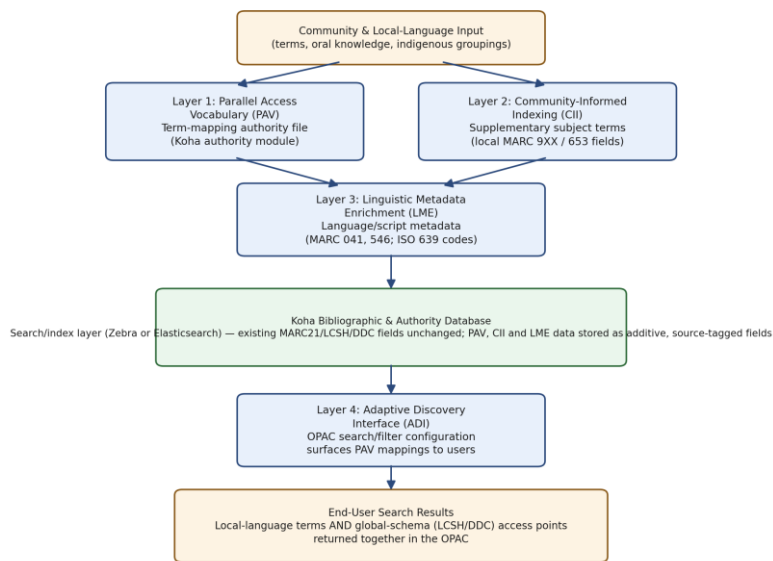


Figure 1. IMKO Layer Architecture and Multilingual Data Flow within Koha.

As the schematic illustrates, PAV and CII data are captured as source-tagged, additive fields rather than as replacements for existing MARC21 elements, and LME enrichment travels through the same indexing pipeline (Zebra or Elasticsearch, depending on the Koha installation) that already serves DDC- and LCSH-based access. Layer 4 (ADI) does not introduce a parallel catalogue; it configures the existing OPAC search interface to surface the additive fields alongside standard headings, so that a single search can return results indexed under either vocabulary.

Metadata Standard Compatibility and Coexistence with Global Schemas

A recurring concern with locally developed vocabularies is that they might fragment catalogue records or interfere with the metadata exchange standards on which resource-sharing, union catalogues, and OAI-PMH or Z39.50/SRU harvesting depend. IMKO is designed to avoid this outcome by treating every local addition as additive rather than substitutive. PAV terms are not written into the controlled 6XX subject-heading fields used by LCSH and DDC-aligned indexing; instead, they are stored either as a separate local authority file within Koha’s authorities module or as uncontrolled local-access fields (e.g., MARC 653, or local 9XX fields), each carrying a source identifier in the \$2 subfield (e.g., “IMKO-PAV”) that distinguishes locally sourced terms from controlled-vocabulary headings. This preserves the integrity of the original 6XX fields for systems, consortia, and union catalogues that expect standard LCSH/DDC content, while still making local terms retrievable within the home institution’s OPAC.

Similarly, Layer 3 (LME) relies exclusively on MARC fields already defined within the MARC21 standard — 041 (Language Code) and 546 (Language Note), populated with ISO 639 codes — rather than introducing non-standard elements. Because these fields are internationally recognized, records enriched in this way remain fully valid for export, Z39.50/SRU retrieval, and union-catalogue contribution. The practical risk that requires ongoing institutional attention is at the indexing-configuration level rather than the metadata-standard level: whichever local fields are chosen for PAV and CII must be explicitly added to Koha’s search-index mapping (within Zebra’s configuration files or, on newer installations, the Elasticsearch mapping) so that they become searchable in addition to, rather than instead of, the default LCSH/DDC-indexed fields. Where this step is skipped, PAV and CII data will still be visible on the catalogue record but will not be retrievable through search — a distinction library systems staff implementing Layer 4 (ADI) need to keep in view.

Application to a Composite Nigerian Academic Library

To assess the practical viability of the IMKO framework, this section considers its application within a composite Nigerian academic library: a generalized profile reflecting characteristics common to many Nigerian university libraries, including a collection organized predominantly under DDC, use of the Koha open-source ILS—the system most widely adopted across Nigerian academic libraries (Jamogha et al., 2022)—a student population of several thousand drawn from multiple states and language groups, a cataloguing department of modest size, and a special collections unit holding theses, project reports, and local history materials of varying linguistic content, including recorded oral sources.

Phased Implementation Pathway

Given typical resource constraints, a phased approach is proposed, sequencing the four IMKO layers by implementation cost and dependency. Table 3 summarizes this pathway.

In the first phase (Layer 3: LME), cataloguing staff begin systematically applying language and script metadata to new acquisitions and, where feasible, retrospectively to special collections materials—a low-cost intervention requiring primarily staff training and revised cataloguing checklists. In the second phase (Layer 1: PAV), the library partners with relevant academic departments—particularly those teaching indigenous languages, linguistics, or area studies—to develop an initial term-mapping list for high-traffic subject areas such as agriculture, health, education, and local governance. This list can begin small (e.g., 100–200 terms) and expand iteratively based on reference desk queries and student feedback.

The third phase (Layer 2: CII) targets special collections and indigenous knowledge materials specifically, where the library works with subject faculty and community informants—following the ethical safeguards highlighted by Chigwada and Ngulube (2024)—to add supplementary descriptive terms reflecting local knowledge structures. The fourth phase (Layer 4: ADI) depends on the first three having produced sufficient mapped data, and involves configuring the OPAC to surface these mappings—a task that may require either in-house technical capacity or collaborative support from the Nigerian Koha-user community, building on the pattern of inter-library knowledge-sharing already documented in Koha-adoption studies (Adeyemi, 2019).

Table 3. Phased Implementation Pathway for IMKO in a Composite Nigerian Academic Library

Phase	IMKO Layer	Activity	Dependency / Precondition
1	LME	Apply language/script/oral-format metadata to new and (where feasible) retrospective records	Staff training on MARC 041/546; revised cataloguing checklist
2	PAV	Develop initial term-mapping list (100–200 terms) for high-traffic subject areas with language/linguistics departments	Departmental partnerships; reference desk query data
3	CII	Add supplementary subject terms for special collections and indigenous knowledge materials, following community consent protocols	Subject faculty and community informant engagement
4	ADI	Configure OPAC to surface PAV mappings and language-based filtering	Sufficient mapped data from Phases 1–3; Koha configuration capacity

Proposed Localized Pilot Phase

The preceding analysis evaluates IMKO conceptually against a composite library profile rather than through deployment on a real collection, and this is an acknowledged limitation of the present study (see Conclusion). To move toward empirical validation, this section outlines a small-scale pilot roadmap through which a single institution could test the framework before committing to full-scale, multi-department implementation.

A suitable pilot would target a bounded, well-defined collection rather than the catalogue as a whole — for example, a special-collections set of theses and extension materials on indigenous agricultural practice catalogued predominantly in, or accompanied by community terminology in, a single major Nigerian language such as Yoruba, Hausa, or Igbo. Restricting the pilot to one language and one subject domain keeps the term-mapping workload manageable (an initial PAV list of roughly 100–150 terms, consistent with the phased pathway in Table 3) while still generating results specific enough to be meaningful.

A two-semester timeline is proposed. In the first semester, cataloguing staff would apply LME metadata to the pilot collection and, working with a language or linguistics department, build the initial PAV term list and configure the corresponding Koha index mappings (Layer 4). In the second semester, the enriched collection would be opened to student and faculty users, with evaluation conducted through three measures: (a) search success rate for a fixed set of local-language test queries, compared before and after PAV/LME implementation; (b) a brief user survey capturing perceived ease of discovery among students who searched in a Nigerian language; and (c) cataloguer time-cost per record, to test the feasibility assumptions underlying the phased implementation pathway outlined above. Community informants involved in term contribution should be engaged under the consent and attribution protocols discussed under Layer 2 (CII), consistent with the ethical safeguards raised by Chigwada and Ngulube (2024).

This pilot design is offered as a roadmap rather than as completed research; its purpose is to specify, concretely, what an empirical test of IMKO would involve so that interested institutions — or a follow-up study by the present authors — can carry it out and report results that the conceptual analysis in this paper cannot by itself provide.

Anticipated Constraints

Several constraints are likely to affect implementation, consistent with documented challenges in Nigerian and African library practice. Staffing: few cataloguing departments include staff with formal training in indigenous languages, making partnerships with language departments essential rather than optional. Infrastructure and training: Koha-adoption studies in Nigeria have repeatedly identified inadequate staff training and limited in-house technical expertise as the principal barriers to fully utilizing the system's modules, even where adoption itself has been largely successful (Adeyemi, 2019; Jamogha et al., 2022); these same constraints would affect Layer 4 (ADI) implementation in particular.

Funding for digitization: research on indigenous knowledge digitization across Africa has consistently found that funding and infrastructure limitations—not lack of will—are the primary obstacles to such projects (Adei et al., 2023), a pattern likely to apply to any LME-related digitization of Nigerian academic library special collections. Policy and ethics: Obot and Kolawole (2025) note that Nigerian libraries generally lack guidelines for the ethical handling of indigenous-language and cultural materials; any CII or PAV initiative involving community knowledge should therefore be accompanied by clear protocols on attribution, consent, and community involvement, consistent with the ethical concerns raised in the broader African LIS literature (Chigwada & Ngulube, 2024). Standardization: in the absence of national or regional coordination, individual institutions risk developing incompatible local vocabularies, limiting the potential for shared catalogue records and union catalogue interoperability—a concern that underscores the importance of professional body involvement, discussed in Section 6.

Technical integration within Koha: beyond the staff-training gap already identified in the Koha-adoption literature (Adeyemi, 2019; Jamogha et al., 2022), several concrete integration tasks are specific to IMKO and

are not addressed by staff training alone. Creating a dedicated PAV authority type, adding local fields such as 653 or institution-specific 9XX fields to the MARC bibliographic framework, and updating the search-index configuration to make those fields retrievable all require system-administrator-level access to Koha's cataloguing and search settings — access that, in many Nigerian academic libraries, sits with a small in-house IT unit or an external vendor rather than with cataloguing staff. These steps also differ depending on whether an installation uses Koha's older Zebra search engine or the newer Elasticsearch backend, and Nigerian Koha installations documented in the adoption literature are not uniform in this respect; Layer 4 (ADI) configuration guidance will therefore need to be written separately for each backend rather than as a single set of instructions. Diacritic and Unicode handling for Nigerian-language terms is a further, easily overlooked integration detail: unless index and display fields are explicitly configured for full Unicode normalization, tonal marks and other diacritics common to Yoruba and Igbo orthography can be dropped or mismatched during indexing, silently reducing the retrievability that PAV is intended to add.

CONCLUSION

Inclusive knowledge organization for multilingual communities is not a peripheral concern for libraries operating in linguistically diverse societies—it is central to the library's function as an equitable gateway to information and to broader goals of cognitive justice (Webster, 2017). This paper has argued that meaningful progress does not require wholesale replacement of established classification and cataloguing systems, which remain valuable for interoperability and resource-sharing, even as the literature documents real and persistent biases within those systems (Howard & Knowlton, 2018; Mossop, 2004; Olson, 2002; Thornton, 2024). Instead, the proposed Inclusive Multilingual Knowledge Organization (IMKO) framework offers a layered, additive pathway through which Nigerian academic libraries can incrementally build local-language access points, enrich metadata, and reflect community knowledge structures within their existing—predominantly Koha-based—infrastructures, drawing on tested precedents such as the Brian Deer Classification System, the Mashantucket Pequot Thesaurus, and the MACS project, and aligned with international guidance from IFLA and UNESCO (Cherry & Mukunda, 2015; Doerr, 2001; IFLA, 2008; Littletree & Metoyer, 2015; UNESCO, 2003). It should be stated plainly that this paper evaluates IMKO conceptually, against a composite library profile, rather than through empirical deployment; Section 5.2 proposes a bounded pilot roadmap as the next necessary step toward testing the framework's practical viability on a real collection.

Realizing this potential, however, will require coordinated action across LIS schools, professional associations, funding bodies, and the open-source systems communities that increasingly underpin library operations across the country. Future research should pursue empirical case studies of specific Nigerian institutions piloting elements of this framework, as well as comparative studies examining multilingual knowledge organization initiatives across other linguistically diverse African contexts.

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