

Filling the Gaps Formal Systems Leave Behind: How Professional Development Compensates for Weak Pre-Service Preparation in Luganda Literature Teachers' Content Knowledge

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Abstract

How continuous professional development (CPD) shapes secondary school teachers' content knowledge (CK) in literature instruction is examined in this article, with a focus on Luganda literature teachers in Uganda. Grounded in Shulman's (1986, 1987) [1, 2] distinction between content knowledge and pedagogical content knowledge, the Luganda Teachers' Workshops (LTWs) are analyzed through interviews with four veteran teachers and two workshop organizers, classroom and workshop observations, and document analysis. Two findings depart from what the literature typically expects of subject-specific CPD. First, workshops are found to function largely as compensation for inadequate university preparation rather than enhancement of already-adequate content knowledge: teachers with 15 to 30 years of classroom experience continue attending workshops after 13 to 25 years of participation, describing university training that covered Luganda literature in a single module. Second, a qualification-experience paradox emerges in which a teacher with a master's degree and 15 years of experience demonstrates deeper content integration than a teacher with 30 years of experience and only a bachelor's degree, suggesting that formal education, rather than years of practice or workshop attendance, predicts content knowledge depth. Assessment literacy, teachers' understanding of national examination formats and question interpretation, emerges as the most strongly triangulated finding in the study. These findings are interpreted through the Adaptive Epistemic Compensation Model, which explains how teacher communities construct informal knowledge infrastructure when formal systems underperform. Empirical evidence is contributed on professional development as remediation rather than enhancement, with implications for teacher education policy in resource-constrained, indigenous-language contexts.

Keywords: Content Knowledge, Teacher Professional Development, Pre-Service Teacher Education, Assessment Literacy, Indigenous Language Education, Uganda

1 Introduction

Research on teacher content knowledge has concentrated overwhelmingly on mathematics and science, leaving language and literature teaching comparatively unexamined despite content knowledge mattering just as much for teaching a novel or a poem as for teaching an equation (Banegas, 2020) [3]. This imbalance is more consequential in contexts where teacher preparation systems are themselves under strain. In Uganda, secondary school teachers of Luganda literature complete university programs that, by their own account, cover the subject in a single module, then spend entire careers teaching four literary genres across two examination levels. Understanding how these teachers develop the content knowledge their degrees did not fully provide is not a peripheral question about professional development design. It is a question about what continuing professional development (CPD) is actually for when pre-service education falls short.

This article investigates that question through the Luganda Teachers' Workshops (LTWs), an annual professional development program organized by the Luganda Teachers' Association (LTA) since the early 2000s, in which university-affiliated facilitators and experienced teachers train several hundred secondary school Luganda teachers each year. The workshops are widely credited, both by organizers and by the teachers who attend them, with strengthening subject-matter expertise in Luganda literature. What that credit actually describes, however, turns out to be more specific and more theoretically interesting than a generic claim about knowledge enhancement.

Two findings drive this article. The first concerns why teachers keep returning. Four veteran teachers in this study, with between 15 and 30 years of classroom experience, reported between 13 and 25 years of workshop attendance. If professional development were simply refreshing already-adequate subject knowledge, this pattern would be unremarkable. But teachers describe workshops as the primary source of literary knowledge their university training never supplied, not as periodic updates to a solid foundation. One teacher put it bluntly: at university, they covered one module on Luganda literature, and asked how that was supposed to prepare anyone to teach both O-Level and A-Level. This reframes the workshops' content-knowledge function from enhancement to compensation, a distinction with consequences for how such programs should be designed, evaluated, and funded.

The second finding complicates any assumption that experience and workshop attendance substitute for formal education. A teacher with a master's degree and 15 years of experience demonstrated more sophisticated content knowledge integration than a teacher with 30 years of experience and 25 years of workshop attendance but only a bachelor's degree. Content knowledge depth tracked formal qualification rather than years in the classroom or years in the workshop room.

Alongside these findings, the study documents assessment literacy, teachers' capacity to interpret national examination formats and design assessments aligned with them, as the single most strongly corroborated finding across five independent data sources. This raises its own question: when workshop-developed content knowledge is filtered so thoroughly through examination requirements, what kind of content knowledge is actually being built, literary understanding or strategic test preparation?

This article addresses the research question guiding the broader dissertation project as it applies to content knowledge: how do Luganda Teachers' Workshops enhance teachers' content knowledge in teaching Luganda literature? It argues that the honest answer requires distinguishing compensation from

enhancement, taking seriously a qualification-experience paradox that existing professional development theory does not anticipate, and treating assessment literacy as a specific, examination-driven form of content knowledge rather than a proxy for literary depth. Empirical evidence is contributed to an under-researched corner of teacher knowledge scholarship, subject-specific CPD for indigenous language literature teachers, and a theoretical account, the Adaptive Epistemic Compensation Model, is offered for what happens to content knowledge development when the formal systems responsible for it do not fully work.

2 Literature Review

2.1 Content Knowledge and Teaching Effectiveness

Content knowledge was established by Shulman (1986) [1] as a foundational category distinct from, but integrated with, pedagogical content knowledge (PCK) in his model of teacher expertise. Content knowledge refers to a teacher's grasp of the facts, concepts, and organizing structures of a discipline, understanding accurate enough to explain material correctly and confidently. This category was later refined by Ball, Thames, and Phelps (2008) [4] for mathematics teaching through a distinction between common content knowledge, the subject knowledge any educated adult might hold, and specialized content knowledge, the deeper and more particular understanding teaching itself demands, such as knowing why a procedure works or anticipating where students will misunderstand a concept. This distinction has proven durable well beyond mathematics, but its empirical application to literature teaching remains limited.

The imbalance matters because literature instruction makes distinctive content knowledge demands: familiarity with a wide range of texts, genres, and literary devices, alongside interpretive and cultural knowledge that a formula-based subject does not require in the same way (Deane, 2020) [5]. For teachers of indigenous or minority languages, these demands intersect with additional complexity. Luganda literature spans rich oral traditions alongside a smaller and more recent body of written texts (Ddamba, 2017; Ssentanda & Asiimwe, 2023) [6, 7], meaning content knowledge for teaching it cannot be reduced to familiarity with a fixed literary canon. University programs preparing Luganda teachers have historically prioritized language structure over literary analysis, a pattern consistent with broader findings on subject-specific gaps in African teacher education programs (Mulkeen, Chapman, DeJaeghere, & Leu, 2007) [8].

2.2 Content Knowledge Development through Professional Development

Professional development has been connected to improvements in teacher knowledge by a substantial literature (Dheeraj & Kumari, 2024) [9], yet it is observed by both Kennedy (2016) [10] and Ventista and Brown (2023) [11] that most professional development research documents program structure, duration, collaborative format, and so on, far more thoroughly than it documents actual knowledge outcomes. Desimone (2009) [12] argues that credible claims about professional development effectiveness require evidence connecting program features to changes in teacher knowledge and, ultimately, to changes in practice and student learning, a chain that studies of content-knowledge-focused CPD rarely trace in full. What this literature does not adequately theorize is the distinction between professional development that enhances existing, adequate content knowledge and professional development that substitutes for content knowledge pre-service education failed to establish. Content focus, active learning, and sustained duration are described as markers of quality by existing frameworks for effective CPD (Darling-Hammond, Hyler, & Gardner, 2017; Guskey, 2023) [13, 14], largely assuming a baseline of adequate initial teacher

preparation onto which CPD builds. Where pre-service preparation is itself inadequate, and evidence from Sub-Saharan African teacher education suggests this is common (Mulkeen et al., 2007) [8], in-service professional development may be doing something categorically different: not refreshing knowledge but establishing it for the first time, years or decades into a teaching career. This distinction, between refresher and remedial function, has received little direct empirical attention, despite its obvious implications for how such programs should be designed and resourced.

2.3 Assessment Literacy as a Content Knowledge Domain

A related but distinct strand of research examines teachers' assessment literacy: their capacity to understand assessment purposes, design valid assessment tasks, interpret results, and align instruction with what will actually be assessed (DeLuca & Klinger, 2010; Xu & Brown, 2016) [15, 16]. It is argued by Xu and Brown (2016) [16] that assessment literacy should be understood not as a fixed competency but as something teachers construct through ongoing engagement with the specific assessment systems governing their practice, a formulation that fits examination-driven education systems particularly well. In high-stakes contexts like Uganda, where the Uganda National Examinations Board (UNEBC) determines student progression, school reputation, and teacher evaluation, understanding how examinations assess a subject constitutes a form of curriculum knowledge within Shulman's (1987) [2] broader PCK model, distinct from, but essential alongside, literary content knowledge itself. Under the Competency-Based Curriculum (CBC), which shifts assessment toward scenario-based, competency-oriented items rather than recall-based questions (Al-Mutawah, Thomas, Eid, Mahmoud, & Fateel, 2019) [17], this knowledge domain becomes still more specialized and less likely to have been covered in pre-service training.

2.4 Gaps in Current Research

Three gaps converge in the present study. First, teacher content knowledge research remains concentrated in mathematics and science, with literature and indigenous language teaching under-examined (Banegas, 2020) [3]. Second, existing professional development frameworks do not clearly distinguish enhancement from remediation, obscuring what CPD programs are actually accomplishing in contexts of weak pre-service preparation. Third, assessment literacy research has rarely been examined alongside general content knowledge development within the same study, leaving unclear how these two domains interact when professional development is filtered through high-stakes examination systems. All three gaps are addressed in this article through a qualitative case study of the Luganda Teachers' Workshops.

3 Theoretical Framework

3.1 Shulman's Content Knowledge and Its Unstated Assumption

Content knowledge is positioned by Shulman's (1986, 1987) [1, 2] model as prior to, and a precondition for, pedagogical content knowledge (PCK): teachers must first know their subject before they can develop the specialized understanding of how to teach it to particular learners. This ordering is rarely stated as an assumption because in well-resourced teacher education systems it is rarely violated. This assumption is directly challenged by the present study's findings. When pre-service preparation does not establish adequate content knowledge, PCK development cannot proceed along the sequence Shulman's model assumes. Teachers instead attempt to build pedagogical content knowledge while simultaneously acquiring the foundational content knowledge the framework treats as already in place. This divergence is treated in this article as a theoretically productive finding rather than a methodological complication, one that extends Shulman's model to contexts his original framework did not anticipate.

3.2 The Adaptive Epistemic Compensation Model

A grounded-theory account (Charmaz, 2006) [18], the Adaptive Epistemic Compensation (AEC) Model, is developed by the dissertation from which this study draws, built inductively from the same thematic findings this article reports. Adaptive Epistemic Compensation is defined as the iterative, community-mediated process (Wenger, 1998) [19] through which teachers construct pedagogical content knowledge by identifying, working around, and collectively filling gaps produced by successive failures of formal educational provision. The model comprises five interrelated processes, three of which bear directly on content knowledge development and are summarized in Table 1.

Table 1. The Three Content-Knowledge-Relevant Processes of the Adaptive Epistemic Compensation Model

Process	Description
Systemic Knowledge Deficit Generation	Names the foundational condition: university teacher education failed to establish adequate content knowledge in Luganda literature before teachers entered classrooms.
Epistemic Scaffolding Differentiation	Describes how the benefit teachers draw from workshops, peer networks, and classroom experience is moderated by each teacher's access to formal theoretical frameworks, typically acquired through graduate education.
Context-Anchored Knowledge Convergence	Explains the one clear domain of formal success: when workshop content addresses a problem teachers face in an identical form in the classroom, such as the shared UNEB examination standard, formal knowledge transfer is reliable.

Note. Two additional processes in the full Adaptive Epistemic Compensation Model are reported in the source dissertation but fall outside this article's content-knowledge focus.

Systemic Knowledge Deficit Generation names the foundational condition: university teacher education failed to establish adequate content knowledge in Luganda literature before teachers entered classrooms. This is the condition that makes everything else in the model necessary. Epistemic Scaffolding Differentiation describes how the benefit teachers draw from workshops, peer networks, and classroom experience is not uniform but moderated by each teacher's access to formal theoretical frameworks, typically acquired through graduate education. Context-Anchored Knowledge Convergence explains the one clear domain of formal success in the data: when workshop content addresses a problem teachers face in an identical form in their own classrooms, in this case, the shared and externally enforced standard of UNEB examinations, formal knowledge transfer works. Where the transition from workshop context to classroom context distorts or dilutes the content, transfer is far less reliable.

Together these processes offer an explanation the existing literature does not: not simply that professional development succeeds or fails, but that it succeeds specifically where workshop content and classroom demand converge on a shared, external reference point, and struggles specifically where it does not.

3.3 Specialized Content Knowledge and Adaptive Expertise

The distinction drawn by Ball et al. (2008) [4] between common and specialized content knowledge remains useful for characterizing assessment literacy as a specific, teaching-relevant form of subject knowledge rather than general literary erudition. To interpret the qualification-experience paradox, this

study draws on the distinction between routine expertise, efficient performance of familiar tasks built through repetition, and adaptive expertise, flexible knowledge application to novel situations built through reflective engagement with underlying principles (Dreyfus & Dreyfus, 1986; Bransford, Brown, & Cocking, 2000) [20, 21]. This distinction anticipates a pattern in which extensive experience alone produces reliable routines without producing the conceptual depth that formal theoretical training can supply.

4 Context

Luganda occupies a distinctive position in Uganda's education system, as both a subject of instruction and the primary language of the Buganda kingdom (Ssentanda & Asiimwe, 2023) [7]. Its formalization as a secondary school subject came relatively late (Ekibiina ky'olulimi Oluganda, 1995) [22], and university programs preparing Luganda teachers have tended to emphasize grammar and language structure over sustained literary study, leaving graduates with uneven exposure to the drama, poetry, prose, and novel genres the secondary syllabus requires at both O-Level and A-Level.

The Luganda Teachers' Association, established in 1988, has organized the Luganda Teachers' Workshops since the early 2000s in partnership with Makerere University, drawing several hundred teachers annually. Workshop themes over the past two decades have moved from broad pedagogical topics, such as integrated approaches to Luganda teaching and the treatment of gender in Luganda literature, toward increasingly assessment-focused content, including examination preparation and, most recently, the content and structure of A-Level examinations. This shift toward assessment-centered programming happened alongside, and partly in response to, Uganda's transition to a Competency-Based Curriculum, which requires teachers to design scenario-based, competency-oriented assessments rather than recall-focused questions, a shift that itself demands new content and curriculum knowledge that pre-service training has not caught up with.

Workshops are funded through participant fees and university partnership rather than government allocation, reflecting a broader pattern in which subject-based teacher associations fill professional development gaps that Ministry of Education programs, focused primarily on general pedagogy through initiatives such as the Teacher Development and Management System, do not fully address for subject-specific content.

5 Methodology

5.1 Research Design

A qualitative case study design was used in this study to examine how Luganda Teachers' Workshops function as continuing professional development, with this article reporting the subset of findings addressing teachers' content knowledge. The design privileged depth of understanding of a bounded, information-rich case over statistical generalizability, consistent with qualitative case study traditions in educational research (Creswell & Poth, 2018) [23].

5.2 Participants and Sampling

Participants were selected through purposive, homogeneous sampling to capture information-rich accounts from those most directly positioned to speak to the workshops' content-knowledge function: four secondary school Luganda teachers with sustained workshop attendance and two workshop organizers. The four teachers ranged from 15 to 30 years of teaching experience and 13 to 25 years of workshop participation. Their academic qualifications varied: three held bachelor's degrees in education, and one

held a master's degree, the only participant with postgraduate qualification. All four taught Luganda literature at O-Level, A-Level, or both, across four schools in Wakiso and Luweero districts. The two organizers, the LTA secretary and treasurer, had been continuously involved in workshop design, coordination, and facilitation since 2000. This homogeneous, veteran-weighted sample was well suited to answering how sustained engagement with workshops shapes content knowledge over time, though it necessarily leaves open how novice teachers, who did not participate in this study, experience the same workshops. Table 2 summarizes the four teacher-participants' profiles alongside the content-knowledge integration observed in their lesson plans, discussed further in the Findings section.

Table 2. Teacher Participant Profiles and Observed Content Knowledge Integration

Teacher	Years Teaching	Years Workshop Attendance	Highest Qualification	Content Knowledge Integration Observed
Teacher 1	15	13	Master's Degree	Strongest integration observed (poetry lesson plan, clear literary objectives, content-appropriate scaffolding)
Teacher 2	18	18	Bachelor's Degree	Adequate integration within assigned genre
Teacher 3	20	23	Bachelor's Degree	Adequate, though basic literary-analysis gaps persisted in places (prose lesson reflection)
Teacher 4	30	25	Bachelor's Degree	Comparatively weaker integration (novel lesson plan) despite longest workshop attendance

5.3 Data Collection

Data collection combined semi-structured interviews, observation, and document review to allow triangulation across sources. Interviews with all six participants explored experiences of content knowledge development, gaps identified in pre-service preparation, and perceptions of workshop impact on literary understanding and assessment practice. Two workshop observation sessions, purposively selected from the 2025 LTW cycle to capture both early and later sessions, documented facilitation of content-focused activities including a dedicated session on item writing and scoring. Four classroom observations, one per participating teacher, captured how workshop-derived content knowledge appeared in actual lesson delivery following workshop attendance. Document review covered workshop training materials, scoring rubrics, and teacher-produced lesson plans and schemes of work, providing independent evidence of content knowledge application outside the interview context.

5.4 Data Analysis

Data were analyzed using Braun and Clarke's (2006) [24] six-phase thematic analysis: familiarization with transcripts and field notes, initial inductive coding, searching for candidate themes, reviewing themes against the coded data, defining and naming final themes, and producing the analytic report. NVivo

software supported systematic coding and cross-source comparison. Themes concerning content knowledge were triangulated across teacher interviews, organizer interviews, workshop observations, classroom observations, and document analysis, with particular attention to convergence and divergence across these five sources.

5.5 Trustworthiness

Credibility was strengthened through expert review of interview and observation protocols, member checking in which participants reviewed interpretations of their accounts, and triangulation across data sources. Dependability was supported through a documented audit trail of methodological decisions. All participants were assigned codes rather than identified by name, and informed consent was obtained in accordance with Makerere University research ethics guidelines.

5.6 Limitations

The sample's homogeneity, four veteran teachers and two long-serving organizers, means the findings speak most directly to how sustained, voluntary workshop participants experience content knowledge development, not to novice teachers or to those who attend workshops only occasionally or not at all. Geographic concentration in Central Uganda and reliance on self-reported perceptions of content knowledge gains alongside observational proxies for enacted knowledge are further constraints addressed in the discussion.

6 Findings

Two major themes explaining how Luganda Teachers' Workshops shape teachers' content knowledge were revealed by analysis of interviews, observations, and documents, alongside a cross-cutting pattern in which content knowledge depth varied by formal qualification rather than experience.

6.1 Compensating for Weak Pre-Service Training

The most consistent and striking finding was how explicitly teachers acknowledged that their university preparation had been inadequate. One teacher explained that university training had only briefly covered literature, leaving limited knowledge to draw on, and credited workshops directly: "Most of the skills I have today were acquired through these workshops" (T01, Interview 1, L1679-1680). Another teacher described the gap in blunter terms: "At university, we did one module on Luganda literature. Just one! How were we supposed to teach O-Level and A-Level with that?" (T06, Interview 6, L234-236). These accounts, offered independently by different participants, point toward a systemic gap in pre-service preparation rather than an individual shortcoming.

Organizers corroborated this compensatory function, though they described their own role in more modest terms. One organizer acknowledged that some teachers admit they learned more from workshops than from their university courses (O1, Interview 1, L126-127), a striking admission that workshops serve a foundational rather than purely supplementary role. Yet the same organizer characterized the workshop's function as helping teachers "polish" or "sharpen" existing skills (O1, Interview 1, L133-134), language suggesting refinement of adequate competence rather than remediation of foundational gaps. This mismatch between how organizers frame their work and what teachers report needing reveals a tension in how the workshops' compensatory role is understood by those who design them.

Sustained attendance patterns provide behavioral evidence for the compensatory interpretation. All four teacher participants combined long teaching careers with proportionally long workshop attendance: 18 years of teaching and 18 years of attendance for one teacher, 15 years of teaching and 13 workshops attended for another, 20 years of teaching and 23 years of attendance for a third, and 30 years of teaching

alongside 25 years of attendance for the fourth. If pre-service training had been adequate, veteran teachers would have little reason to seek annual refreshers spanning two to three decades. That the most experienced participant, with 30 years in the classroom, continued attending workshops suggests foundational needs that university preparation never fully resolved.

Classroom observation and lesson plan analysis add a further layer. While all four teachers showed strong content knowledge within their assigned genres, gaps persisted even after decades of practice. One teacher's prose lesson plan reflection noted that some students needed more guidance identifying narrative perspective and conflict, a basic literary analysis skill, after 20 years of teaching and 23 years of workshop participation. Notably, the strength of content knowledge integration did not track years of experience. The teacher with a master's degree and only 15 years of experience demonstrated the most sophisticated content knowledge integration, observed directly in a poetry lesson plan, while the teacher with 30 years of experience produced a comparatively basic approach, a pattern discussed further below and summarized in Table 2.

Taken together, this theme indicates that Uganda's university teacher preparation system has under-prepared Luganda literature teachers for the full demands of secondary instruction. A single university module proved insufficient grounding for teaching four literary genres, drama, poetry, prose, and the novel, across two certification levels over multi-decade careers. Workshops functioned as an essential compensatory mechanism, providing foundational content knowledge that pre-service education did not deliver, which explains why veteran teachers kept returning: not to update pedagogical trends, but to continue building content expertise that should have been established before they ever entered a classroom.

6.2 Exam Question Interpretation and Assessment Literacy

Assessment literacy emerged as the study's most robustly triangulated finding, corroborated across all five data sources: teacher interviews, organizer interviews, workshop observations, classroom observations, and document review. Teachers described gaining specific, practical competencies. One teacher described developing "skills in understanding UNEB exam format and interpreting questions correctly" (T01, Interview 1, L1780-1784), noting that facilitators dedicate time to helping teachers understand and interpret changes in examination structure, particularly around question interpretation (T01, Interview 1, L122-123). The same teacher connected this knowledge directly to classroom practice, explaining that skills gained supported preparation of schemes of work and the design of exams (T01, Interview 1, L122-123), indicating that assessment knowledge shaped instructional planning across the academic year rather than only during exam preparation periods.

Organizers treated assessment outcomes as their primary measure of workshop effectiveness. One explained that impact "becomes evident after setting exams for the students," when teachers' learning becomes visible in students' responses (O1, Interview 1, L159-162). A second organizer confirmed this evaluative logic directly: "We can gauge their understanding indirectly through students' performance in the LTA exams" (O2, Interview 2, L424-426). This reliance on downstream examination performance as an indicator of teacher learning reflects organizers' confidence that assessment-focused content produces measurable impact, even without direct measures of teacher content knowledge itself.

Workshop observation confirmed this emphasis through dedicated instructional time. An entire session addressed "Item Writing and Scoring," and field notes recorded facilitators reporting on the previous year's UNEB results and reminding participants to practice setting scenario-based questions, a format the Competency-Based Curriculum requires but that traditional recall-based training did not prepare teachers to construct. Document review reinforced this pattern: workshop materials included detailed scoring

rubrics assessing output, relevancy, accuracy, coherency, and excellency, alongside handouts covering continuous assessment frameworks, checklists, and multiple item-writing approaches extending beyond terminal examinations.

Lesson plan analysis showed this knowledge translating into classroom application across all four teachers regardless of genre taught. Drama, poetry, prose, and novel lesson plans each incorporated assessment structures, annotation tasks, scoring rubrics, and identification exercises aligned with UNEB question formats, a consistency that held despite the teachers' varied experience levels and different literary genres. This cross-teacher consistency suggests workshops successfully transmitted a specific, well-defined content domain: not literary interpretation in the abstract, but literary interpretation organized around how it would be examined.

This success also raises a question the data cannot fully resolve. Was the content knowledge being developed here literary knowledge shaped by scholarly or pedagogical principles, or strategic knowledge shaped primarily by examination requirements? The evidence suggests both occurred simultaneously: teachers gained genuine content knowledge, themes, literary devices, narrative structures, but acquired it through the lens of how that content would be assessed, a pragmatic form of professional development suited to a high-stakes testing environment, but one in which content knowledge development is inherently instrumental rather than purely intellectual.

6.3 The Qualification-Experience Paradox

A pattern cutting across both themes deserves separate treatment because it complicates a common assumption in teacher development research and practice: that years of experience, reinforced by sustained workshop attendance, reliably build content knowledge. The teacher with a master's degree and 15 years of experience produced the strongest evidence of integrated content knowledge, in a poetry lesson plan with clear literary objectives and content-appropriate pedagogical scaffolding. The teacher with 30 years of experience and 25 years of workshop attendance, but only a bachelor's degree, produced comparatively weaker content integration in a novel lesson plan, despite having attended more workshop cycles than any other participant.

If years of practice alone built content expertise, this most experienced teacher should have shown the deepest content knowledge in the sample. The evidence instead points toward formal graduate education as the more reliable predictor, suggesting that experience and workshop attendance provide raw material for content knowledge development, but that theoretical frameworks acquired through advanced study are what allow teachers to organize, deepen, and apply that material with sophistication. This finding, more than any other, complicates a straightforward compensatory story: workshops compensate for pre-service gaps to a point, but they do not fully substitute for the kind of formal educational preparation that produces the deepest content knowledge integration.

7 Discussion

7.1 Refresher Versus Remedial Professional Development

The clearest theoretical contribution of these findings is the distinction between refresher and remedial professional development, a distinction existing CPD frameworks do not draw explicitly. Refresher development assumes adequate initial preparation and periodically updates it. Remedial development addresses foundational gaps that pre-service education should have closed but did not. The Luganda Teachers' Workshops operate primarily in the second mode, a fact obscured by organizers' own language of "polishing" and "sharpening," which implies refresher function even as organizers acknowledge, in the

same breath, that some teachers learned more from workshops than from their degrees. This is not a minor semantic point. A workshop designed as a refresher, built around updating competent practitioners on recent developments, will look different in structure, pacing, and depth from one designed to establish foundational knowledge for teachers who never received it. The mismatch between workshop design (veteran-oriented, update-focused) and what teachers actually needed (foundational content) may itself limit how much support the workshops can ultimately provide, however committed their veteran participants remain.

This finding extends Shulman's (1986, 1987) [1, 2] PCK framework in a direction the original model did not anticipate. Shulman's sequencing, adequate content knowledge as precondition for pedagogical content knowledge, assumes a functioning pre-service system. Where that system fails, as it demonstrably did for the teachers in this study, PCK development must proceed along what might be called a remedial trajectory, in which teachers attempt to build pedagogical content knowledge while simultaneously acquiring the foundational content knowledge the framework assumes already exists, rather than an enhancement trajectory in which professional development integrates and deepens already-adequate knowledge components. Recognizing these as two distinct trajectories, rather than treating all professional development as enhancement by default, has direct implications for how content-focused CPD should be designed and evaluated in contexts of documented pre-service inadequacy.

7.2 What the Adaptive Epistemic Compensation Model Adds

The Adaptive Epistemic Compensation Model offers an explanatory account that neither Shulman's framework nor general professional development theory fully provides. Systemic Knowledge Deficit Generation names the university-level failure that makes remedial function necessary in the first place. Epistemic Scaffolding Differentiation explains why that remedial function does not benefit all teachers equally, an explanation directly relevant to the qualification-experience paradox discussed below. Context-Anchored Knowledge Convergence explains why assessment literacy, of all the content knowledge domains workshops might address, emerged as the clear success story: because UNEB examinations function as a fixed, externally enforced, and identical reference point across the workshop setting and the classroom setting, the usual gap between what is taught in a workshop and what can be applied in an under-resourced classroom does not open up in the same way. Assessment literacy transfers well specifically because the problem it solves is the same problem in both contexts. General literary content knowledge, by contrast, must survive translation from workshop discussion into classrooms with sixty students, limited materials, and syllabus coverage pressure, a translation that appears to erode more of what was taught.

This account also reframes the concern, raised above, about whether assessment-driven content knowledge substitutes for literary depth. The model suggests this is not a design flaw so much as a structural outcome: workshops succeed most visibly precisely where formal content and classroom demand align most tightly, and that alignment happens to run through examinations rather than through literary scholarship, because examinations are what create a shared, high-stakes, unavoidable reference point for both teachers and organizers.

7.3 The Paradox and the Limits of Experience

The qualification-experience paradox is best understood through the distinction between routine and adaptive expertise (Dreyfus & Dreyfus, 1986; Bransford et al., 2000) [20, 21]. Extensive teaching experience combined with sustained workshop attendance appears to generate routine expertise, reliable, well-practiced approaches to familiar material, without necessarily generating the adaptive expertise that

allows a teacher to reorganize content knowledge flexibly for a specific poem, a specific class, or a specific gap in student understanding. Graduate education appears to supply something workshops and experience alone do not: theoretical frameworks through which a teacher can organize and interrogate accumulated experience rather than simply repeat it. This has an uncomfortable implication for the compensatory story told above. Workshops can fill gaps left by weak pre-service preparation, and clearly do so to a meaningful extent, but they do not appear to fully substitute for the deeper integration that formal graduate-level study makes possible. Compensation has a ceiling that experience and workshop attendance alone do not overcome.

7.4 Policy and Practice Implications

These findings point toward specific, actionable responses rather than generic calls for "more professional development." University teacher education programs preparing Luganda teachers should expand literary content coverage across all four secondary-level genres, closing the gap a single module leaves behind, and should embed UNEB assessment analysis directly into methods courses, since assessment literacy is precisely the domain where formal instruction has proven most transferable. Ministry of Education and National Curriculum Development Centre policy should treat the persistence of veteran teachers' content gaps as evidence that pre-service certification standards need enforcement, not merely that in-service programs need funding. Recognizing and formally supporting grassroots, association-led professional development, such as the LTWs, matters, but it should not be mistaken for a solution to pre-service inadequacy. It is, at best, a compensatory mechanism whose sustainability depends on veteran teachers' willingness to keep showing up for two or three decades, a willingness that cannot be assumed of the teachers now entering the profession.

7.5 International Significance

While this study is grounded in one indigenous language teaching context, the underlying pattern, subject-based teacher associations compensating for pre-service inadequacy through voluntary, sustained professional development, plausibly extends to other contexts where formal teacher education systems face similar resource and capacity constraints, particularly in minority or indigenous language education elsewhere in Sub-Saharan Africa and beyond. The distinction between refresher and remedial CPD, and the finding that formal qualification predicts content knowledge depth more reliably than experience or CPD attendance, are claims worth testing in those adjacent contexts rather than assumptions specific to Luganda alone.

8 Conclusion

This study examined how Luganda Teachers' Workshops shape secondary school teachers' content knowledge in literature instruction, finding that the workshops function substantially as compensation for inadequate pre-service university preparation rather than enhancement of already-adequate knowledge, evidenced by veteran teachers' sustained 13 to 25 year attendance patterns and their own direct testimony about the limits of their university training. Assessment literacy emerged as the domain of clearest formal success, explained through the Adaptive Epistemic Compensation Model's account of context-anchored knowledge convergence. A qualification-experience paradox further revealed that formal graduate education, not years of practice or workshop attendance, best predicted content knowledge depth, complicating any assumption that sustained CPD participation alone can close gaps left by weak initial teacher preparation.

Theoretically, the study extends Shulman's PCK framework by distinguishing a remedial trajectory of professional development from the enhancement trajectory his original model assumes, and it introduces the Adaptive Epistemic Compensation Model as an account of how teacher communities build informal knowledge infrastructure when the formal systems responsible for content knowledge, universities, government, and workshop design itself, do not fully deliver. Practically, the findings call for expanded literary content coverage in university teacher education, formal embedding of assessment literacy training in pre-service methods courses, and policy recognition that grassroots professional development, however valuable, cannot substitute indefinitely for adequate pre-service preparation. Future research should examine how novice teachers, absent from this veteran-weighted sample, experience the same workshops, and should track content knowledge development longitudinally to establish whether the compensatory gains documented here prove durable across a teaching career or require continual renewal.

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