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A Professional Development Framework for Effective Kiswahili Instructional Practices in Junior Schools

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Abstract

Professional development is central to educational reform, particularly where curriculum change requires teachers to acquire new technological, pedagogical and content competencies. Kenya's transition from the 8-4-4 system to Competency-Based Education (CBE) has placed new demands on Kiswahili teachers' instructional practices, yet the literature offers limited evidence of a professional development framework built specifically from the technological, pedagogical and content-knowledge (TPACK) needs of Junior School Kiswahili teachers. This paper addresses that gap by presenting the fourth objective of a wider study — to develop a professional development framework for effective Kiswahili instructional practices — conducted among teachers and Curriculum Support Officers (CSOs) in Nyamache Sub-County, Kenya. The study adopted a convergent mixed-methods design, drawing on a TPACK-Deep-Scale-adapted teacher questionnaire (77 of 90 targeted teachers, 85.6% response), semi-structured interviews with 12 teachers and all four CSOs, and structured observation of 36 lessons. Technological knowledge recorded the highest composite Need Index (M = 0.527), followed by content knowledge (M = 0.391) and pedagogical knowledge (M = 0.366, the lowest). Thematic analysis of CSO and teacher interviews showed unanimous support for learner-centered, competency-based pedagogy, technology integration, coaching and mentoring through Professional Learning Communities (PLCs), multi-stakeholder collaboration, and continuous rather than one-off professional development. Triangulating these quantitative, qualitative and classroom-observation strands, the study developed the Integrated TPACK–School-Based Teacher Support System Professional Development Framework (ITSPDF): a six-stage cyclical model comprising Needs Assessment, TPACK-Based Professional Development, School-Based Professional Learning (SBTSS), Classroom Implementation, Monitoring/Evaluation/Feedback, and Sustainability and Continuous Improvement, underpinned by TPACK (Mishra & Koehler, 2006), Adult Learning Theory, Social Constructivism (Vygotsky, 1978) and Guskey's (2002) model of professional development evaluation. The framework is presented with a supporting logic model, an implementation matrix and a data-based demonstration linking each stage to the study's empirical evidence, and is intended for use by the Teachers Service Commission, the Kenya Institute of Curriculum Development, Curriculum Support Officers, school leaders and teacher-training institutions in

planning continuous, evidence-based, school-embedded professional development for Kiswahili instruction.

Keywords: Professional Development Framework, Tpack, School-Based Teacher Support System, Kiswahili Instruction, Competency-Based Education, Needs Assessment

Introduction

Background and Rationale for the Framework

Teacher professional development is widely regarded as a central lever of educational reform, because curriculum change succeeds only to the extent that teachers acquire the technological, pedagogical and content competencies it demands. Research increasingly shows that the quality of professional development depends not merely on whether teachers attend training, but on how professional learning connects to classroom practice: effective programmes tend to be content-focused, active, collaborative, supported by coaching and feedback, and sustained over time (Darling-Hammond, Hyler, & Gardner, 2017; Desimone & Garet, 2015). Guskey (2002) adds that professional development should ultimately be judged by its influence on classroom implementation and on learner outcomes.

These demands become acute when an entire education system changes its curriculum. Kenya's transition to Competency-Based Education (CBE) represents a complete departure from the 8-4-4 system that had been in place for over three decades, a system with which most serving teachers are personally familiar as its own graduates. Teachers are therefore being asked to teach in ways that differ from those through which they were themselves taught, in both content and approach, and capacity-building efforts need to be guided by empirical evidence of what teachers actually need.

Kenya's existing professional development arrangements, however, do not yet supply that evidence in a usable form. The Teachers Service Commission (TSC) has instituted performance-appraisal mechanisms, including performance contracting for school heads and the Teacher Performance Appraisal and Development (TPAD) tool for all teachers, intended to enhance instructional quality through systematic appraisal and feedback. Yet despite the well-defined objectives of TPAD, there is currently no clear framework for using appraisal reports to guide teacher professional development effectively (Ituma, 2022; Kariuki & Guantai, 2020). Appraisal can show where performance falls short, but it does not by itself provide a structured pathway for professional learning.

The problem is sharpest at the level of the subject. Kiswahili is a national and official language of Kenya and a core Junior School subject, and its teaching spans listening, speaking, reading, writing, grammar and literature. Teachers must teach these strands through learner-centered, competency-based approaches while also drawing on digital resources. This combination is what the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006) is designed to describe, since it treats technological, pedagogical and content knowledge as interdependent rather than separate. Yet the literature provides limited evidence of a professional development framework developed specifically from the identified TPACK needs of Junior School Kiswahili teachers. Without such evidence, professional development risks being generic, delivered as one-off events, and detached from the classroom problems that teachers actually face.

This paper addresses that problem. It reports the part of a wider study, conducted among Kiswahili teachers and Curriculum Support Officers (CSOs) in Nyamache Sub-County, Kenya, that used empirically established TPACK needs to develop a professional development framework for effective Kiswahili instructional practices.

Novelty and Contribution of the Study

The study is novel in four respects. First, to the researcher's knowledge, it offers the first professional development framework for Kiswahili instruction derived directly from the measured TPACK needs of Junior School teachers, rather than adapted from generic models of teacher training. Second, it combines TPACK, which specifies what knowledge teachers need, with a School-Based Teacher Support System (SBTSS), which specifies how that knowledge can be built and sustained within schools, producing the six-stage cyclical Integrated TPACK–SBTSS Professional Development Framework (ITSPDF). Third, each stage of the framework is traced to triangulated evidence — a normalized Need Index, interviews with teachers and CSOs, and 36 observed lessons — and is operationalized through a logic model and an implementation matrix that assign actors and indicators. Fourth, it extends TPACK and professional development scholarship to an African-language teaching context that, to the researcher's knowledge, remains under-represented in that literature.

The study contributes to the social sciences in three ways. Theoretically, it shows how TPACK can be used both diagnostically and prescriptively when integrated with adult-learning theory, social constructivism and Guskey's (2002) evaluation model, which together explain how teacher learning is socially organized and sustained. Methodologically, it demonstrates a replicable procedure for converting survey measures into comparable Need Indices and triangulating them with qualitative and observational evidence in a convergent mixed-methods design. In terms of policy and practice, it gives the TSC, the Kenya Institute of Curriculum Development (KICD), CSOs and school leaders an evidence-based, context-sensitive model for planning continuous professional development during curriculum reform, with potential relevance to language-teacher development in similar multilingual settings.

Purpose of the Study

The study aimed to develop a framework for professional development needs for effective instructional practices in Kiswahili.

The corresponding research question was:

What professional development framework can be developed to address the identified needs of teachers of Kiswahili for effective instructional practices?

Theoretical Framework

The study was anchored in the Technological Pedagogical Content Knowledge (TPACK) framework, which provides a basis for understanding the forms of knowledge teachers require when integrating subject content, instructional approaches and technology. Maria et al. (2020) associate TPACK with teachers' capacity to make informed decisions about how technology can support the teaching of particular content through appropriate pedagogical approaches — a perspective especially relevant where teachers are increasingly expected to use digital resources while maintaining learner-centered, pedagogically appropriate classroom practice.

TPACK was developed by Mishra and Koehler (2006) from the interaction among three broad areas of teacher knowledge: Content Knowledge (CK), Pedagogical Knowledge (PK) and Technological Knowledge (TK). Rather than treating these as independent competencies, the framework emphasizes the knowledge that develops where they intersect, giving rise to Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK) and the integrated domain of Technological Pedagogical Content Knowledge (TPACK).

TPACK was considered suitable for the present study because the professional development needs of Junior School Kiswahili teachers cannot be understood adequately by examining technological competence, pedagogical competence or subject mastery in isolation. A teacher may possess considerable knowledge of Kiswahili yet still need support in selecting learner-centered strategies for teaching a particular language concept; equally, a teacher able to operate digital technologies may lack the knowledge needed to select and use them appropriately for teaching listening, speaking, reading, writing, grammar or literature. The framework therefore enabled the study to examine both the individual knowledge domains and the relationships among them, and — critically for Objective Four — was used diagnostically to identify areas in which teachers required additional professional support, with the resulting evidence informing the development of the proposed professional development framework.

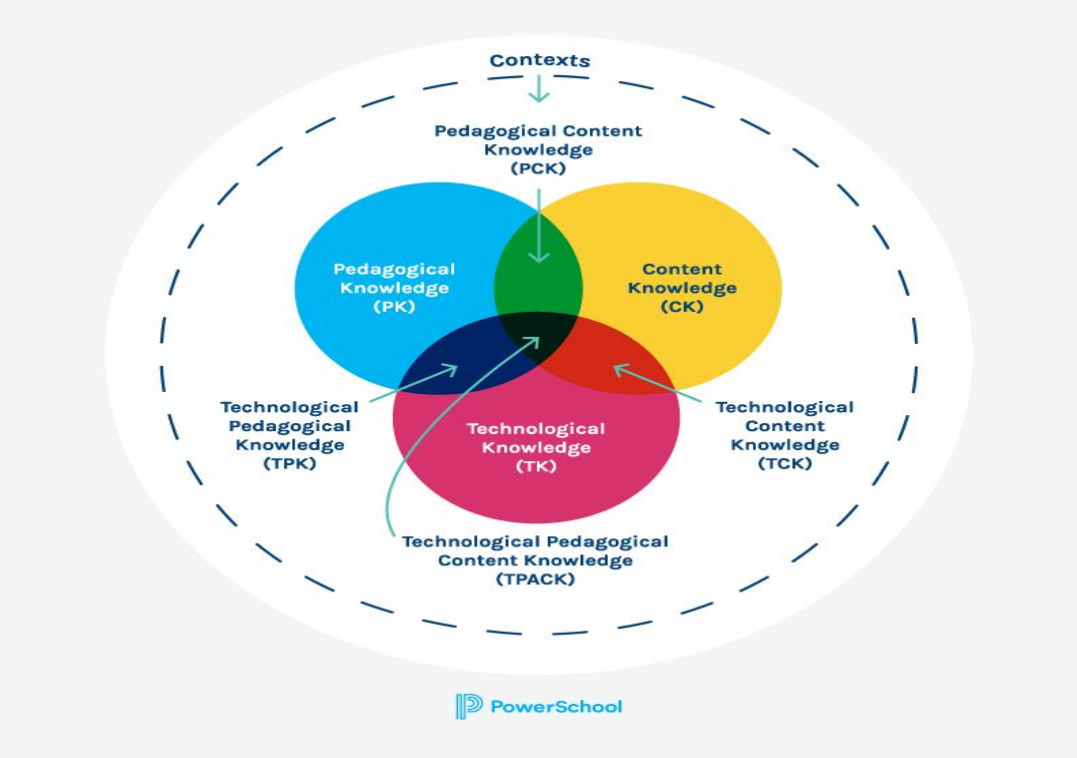


Figure 1 The Components of the TPACK Framework
Source: Adapted from Mishra and Koehler (2006).

Professional development needs are not static: changes in curriculum expectations, instructional resources, learner characteristics and educational technologies generate new areas of need over time. Continuous assessment is therefore necessary if professional development for Kiswahili teachers is to remain responsive to classroom realities and the

evolving demands of CBE — a principle that becomes the first stage of the framework presented in section 5 below.

Operational Definitions

- Needs assessment: the process of identifying the gap between the desired goals set for Kiswahili teachers and their actual performance in instructional practice.
- Need Index: a composite score computed through min-max normalization of related questionnaire items, used to quantify the magnitude of a professional development need within a given TPACK domain; higher values indicate greater unmet need.
- School-Based Teacher Support System (SBTSS): a structured professional development approach that promotes continuous teacher learning through coaching, mentoring, lesson study, peer observation, collaborative planning and professional learning communities within schools.
- Integrated TPACK-SBTSS Professional Development Framework (ITSPDF): the study's proposed professional development framework, combining the TPACK theoretical framework with the School-Based Teacher Support System.
- Professional development needs: the process of improving the knowledge, skills and attitudes of teachers to enhance their instructional practices, composed of technology, pedagogical and content-delivery needs in Kiswahili language teaching.

Literature Review: Professional Development Frameworks for Kiswahili Instruction

Research on teacher professional development increasingly emphasizes that programme quality depends not merely on whether teachers attend training but on how professional learning is connected to classroom practice. Across different studies and professional-development models, recurring principles include attention to subject content, opportunities for active application, collaboration among teachers, coaching or expert support, feedback, sustained engagement, and relevance to teachers' actual working conditions (Darling-Hammond, Hyler, & Gardner, 2017; Popova et al., 2022; Sancar, Atal, & Deryakulu, 2021; Sims et al., 2021).

Sancar et al. (2021) emphasize the importance of connecting professional learning with teachers' classroom environments, while Guskey (2002) draws attention to the relationship among professional development, classroom implementation and changes in learner outcomes. Together, these perspectives suggest that professional development should create opportunities for teachers to apply new knowledge, examine its effects in practice, and receive support as they refine their instruction.

Professional development needs also arise from various sources. Ertmer (1999) distinguishes between external constraints, such as inadequate equipment, time or institutional support, and teacher-related factors such as beliefs, confidence and established practices. This distinction matters because a professional-development programme cannot address inadequate infrastructure merely by increasing teachers' knowledge, while provision of equipment may have limited instructional benefit where teachers lack the professional knowledge required to integrate it meaningfully.

Collaborative and reflective approaches provide additional mechanisms for sustaining professional learning. Coaching, mentoring, lesson study and Professional Learning

Communities enable teachers to examine classroom problems with colleagues, test new practices and obtain feedback. Schön's (1983) account of reflective practice similarly emphasizes continuous examination and adjustment of professional action rather than treating learning as separate from practice.

Adult-learning perspectives further suggest that professional development should recognize teachers as experienced practitioners. Knowles' theory of andragogy emphasizes that adult learners bring valuable prior experience to learning, are motivated by solving immediate work-related problems, and prefer learning with direct practical application to their professional responsibilities (Knowles, 1984; Knowles et al., 2005). Applied to Kiswahili teacher development, this implies that professional learning should begin with the problems teachers encounter in actual lessons and enable them to participate actively in identifying and addressing those problems, rather than functioning only as recipients of predetermined training (Knowles, 1984).

Taken together, the reviewed literature suggests that professional development for Kiswahili teachers should be needs-based, subject-specific, collaborative, classroom-connected and continuous, consistent with the characteristics of effective teacher professional development identified in the literature (Desimone, 2009; Darling-Hammond, Hyler, & Gardner, 2017). However, the literature provides limited evidence of a framework developed specifically from the identified technological, pedagogical and content-knowledge (TPACK) needs of Junior School Kiswahili teachers. The present study sought to address this gap by using empirical findings from the TPACK domains to inform an integrated professional development framework.

Methodology

Design and Approach

The study adopted a convergent mixed-methods design, collecting quantitative and qualitative data concurrently and integrating them during interpretation. Data were collected from Kiswahili teachers and Curriculum Support Officers (CSOs) across four zones of Nyamache Sub-County using a TPACK-Deep-Scale-adapted teacher questionnaire, semi-structured interviews with teachers and CSOs, and structured classroom observation. Of 90 targeted teachers, 77 completed the questionnaire (85.6% response rate); 12 teachers participated in interviews and observations; all four CSOs in the sub-county were interviewed; and 36 lessons (12 teachers × 3 sessions each) were observed using an adapted Classroom Observation Tool for Language Instruction (COTLI) checklist, previously applied in language-instruction research by Cai (2015) and Rassaei (2017). Validity was established through expert review at Maseno University, while reliability was confirmed through test-retest reliability (Pearson's $r = .724$) and inter-rater agreement (Cohen's $\kappa = .801$).

Triangulation Across the Three Data Sources

To strengthen the credibility of the findings feeding into the framework, the study employed data triangulation, drawing on three independent sources for each objective: the teacher questionnaire (quantitative), semi-structured teacher and CSO interviews (qualitative), and structured classroom observation across the 36 lessons. This allowed the study to cross-check self-reported needs against independently observed classroom behaviour rather than relying on a single data source. Three triangulation relationships are reported: convergence, where

two or more sources point to the same conclusion, strengthening confidence in the finding; complementarity, where one source explains or adds depth to a pattern the other could not account for alone; and confirmation from classroom observation, where observed practice is checked against what teachers reported.

Computation of Need Indices

To enable standardized comparison of professional development needs across the three TPACK domains, a composite Need Index was computed for each domain — Technological, Pedagogical and Content — from the corresponding questionnaire items. Negatively worded items were reverse-coded so that higher values consistently reflected greater need; a raw composite score was then calculated for each respondent as the mean of the (reverse-coded) items within that domain, and each raw composite was subjected to min-max normalization (Patro & Sahu, 2015) to a 0–1 range. A value closer to 1 indicates greater reported need. This procedure produced the Technological Need Index (M = 0.527), Pedagogical Need Index (M = 0.366) and Content Need Index (M = 0.391) that anchor the framework developed in response to Objective Four.

Analysis of Qualitative Data and Derivation of the Framework

Qualitative data from the teacher and CSO interviews, together with relevant field notes and open-ended responses, were analyzed thematically using the general procedure described by Braun and Clarke (2006): familiarization with the material, generation of initial codes from segments reflecting teachers' experiences, challenges, professional development needs and recommendations, grouping of codes into candidate themes corresponding to the study objectives, and review of themes against both the coded extracts and the wider dataset. During interpretation, the finalized themes were compared with the quantitative questionnaire results and classroom-observation evidence to identify areas of convergence, complementarity or divergence. This convergent mixed-methods integration enabled the study to distinguish between reported professional development needs, participants' explanations of those needs, and practices demonstrated during classroom instruction; the integrated evidence directly informed the professional development framework developed in response to the fourth research objective.

Ethical Considerations

The study observed standard ethical procedures, including institutional research authorization, informed consent of teachers and CSOs, voluntary participation, and confidentiality of individual responses; classroom observation and interview data were anonymized prior to analysis and reporting.

Results: A Professional Development Framework for Kiswahili Instruction

This section presents the findings that informed the development of a professional development framework for teachers of Kiswahili in Junior Schools. The framework is derived from the technological, pedagogical and content-knowledge needs established under the first three objectives, together with evidence from teachers, Curriculum Support Officers, and classroom observations. The section integrates the identified professional development needs into a coherent framework intended to support continuous, collaborative, school-based professional development and enhance effective instructional practices in Kiswahili.

Rationale: Linking the Need Indices to the Framework

Table 1

(Table 4.27 in source): Need Index Means and Ranking

Domain	Need Index Mean	Rank
Technological Knowledge	0.527	1st (highest need)
Content Knowledge	0.391	2nd
Pedagogical Knowledge	0.366	3rd (lowest need)

Technology integration represents teachers' most pressing need, followed by content upgrading, with pedagogy the smallest gap. The framework sequences technological capacity-building as an entry point while integrating all three domains within one continuous cycle, consistent with the TPACK framework's treatment of technological, pedagogical and content knowledge as interdependent rather than sequential (Mishra & Koehler, 2006).

Thematic Analysis of CSO Interviews

Table 2

(Table 4.28 in source): Thematic Analysis of CSO Interviews

Theme	CSOs	%
Learner-centered, competency-based pedagogy as foundational	4	100%
Technology/ICT integration as a priority need	4	100%
Coaching, mentoring, and PLCs as core support mechanism	4	100%
Multi-stakeholder collaboration required for implementation	4	100%
Continuous/cyclical PD rather than one-off events	4	100%
Funding and ICT infrastructure as a precondition	3	75%
Explicit citation of the TPACK framework	2	50%
Needs assessment named as the framework's starting stage	1	25%

The thematic analysis revealed a high level of consensus among the four Curriculum Support Officers regarding the elements that should underpin the proposed professional development framework. All respondents (100%) emphasized learner-centered, competency-based pedagogy, technology integration, coaching and mentoring through Professional Learning Communities (PLCs), multi-stakeholder collaboration, and continuous professional development as essential components of an effective framework. From a social-constructivist perspective, learning is strengthened when learners participate actively, interact with others, and receive appropriate support during knowledge construction (Vygotsky, 1978).

Three respondents (75%) further identified adequate funding and ICT infrastructure as critical enablers for successful implementation. Although only half of the respondents (50%) explicitly referred to TPACK, their recommendations reflected its core principles of integrating technology, pedagogy and content knowledge. Only one respondent (25%) identified needs assessment as the framework's starting point, underscoring the importance of tailoring professional development to teachers' identified needs. These findings are consistent with the literature, which emphasizes that effective teacher professional development is content-

focused, collaborative, continuous, and responsive to teachers' professional needs (Darling-Hammond et al., 2017; Mishra & Koehler, 2006; Guskey, 2002).

Triangulation with Quantitative and Observational Findings

Convergence: the Need Index ranking places Technological Knowledge highest (0.527), ahead of Content (0.391) and Pedagogical Knowledge (0.366, lowest). This converges with the CSO interview data, where Technology/ICT integration as a priority need and continuous/cyclical PD were each cited by all four CSOs (100%) — independent quantitative and qualitative strands agreeing that technological capacity-building should anchor the framework's entry point.

Complementarity: CSOs frame coaching, mentoring and PLCs as a core support mechanism at the systems level (100%) but do not specify its form. Teacher interviews fill this gap: 83.3% named Professional Learning Communities, peer observation and lesson study specifically; another 83.3% named mentorship or coaching by experienced teachers or CSOs; and 41.7% explicitly called for CSOs to move from administrative supervision toward instructional coaching — together giving the coaching-and-mentoring stage a concrete, teacher-informed shape neither source alone could supply. Research on professional learning communities shows that sustained collaboration can influence teaching practice when teachers collectively examine instruction, learner evidence, and problems arising from classroom practice (Vescio et al., 2008).

Confirmation from classroom observation: across the three objectives, the weakest observed practices — monitoring (58.3%), formative assessment (63.9%), behaviour management (66.7%) and incorporation of cultural references (58.3%) — all cluster around sustained, in-practice support rather than one-off inputs. This behaviorally confirms the CSOs' unanimous emphasis on continuous, cyclical professional development (100%), and is the basis for structuring the framework as a recurring cycle rather than a linear, one-time sequence.

The convergence of teacher, CSO and observation evidence in favour of continuous professional development supports a shift away from isolated workshops: effective professional development is more likely to influence practice when it is sustained, collaborative, connected to teachers' content and classroom problems, and supported through implementation and feedback (Darling-Hammond et al., 2017; Guskey, 2002).

The Integrated TPACK–SBTSS Professional Development Framework (ITSPDF)

The six-stage cycle emerging from the Need Indices and CSO themes above is consolidated here into the Integrated TPACK–SBTSS Professional Development Framework (ITSPDF). Each stage is justified by triangulating the quantitative Need Index results, teacher and CSO interview themes, classroom observation findings, and the underlying theory or framework informing it.

1. Needs Assessment — uses the Need Index rankings (Technology 0.527, Content 0.391, Pedagogy 0.366) and teacher-reported training gaps to determine what teachers actually need before any intervention is designed. This reflects Knowles's Adult Learning Theory,

which holds that professional development must be needs-driven and problem-centered rather than generic.

2. TPACK-Based Professional Development — the core training stage, prioritized because technology showed the highest need. Teachers receive training that integrates technological, pedagogical and content knowledge together rather than as separate competencies, following Mishra and Koehler's (2006) argument that effective teaching requires these three domains to function as an interdependent whole.

3. School-Based Professional Learning (SBTSS) — moves PD out of one-off workshops into the school itself, through peer observation, lesson study, mentoring and Professional Learning Communities. This draws on Vygotsky's theory of social constructivism, which holds that learning occurs through social interaction, collaboration and community rather than in isolation.

4. Classroom Implementation — puts the integrated TPACK skills into practice in real lessons. Grounded in Constructivism and CBE Principles, which hold that learners actively construct knowledge through meaningful, hands-on experiences — the same logic the framework applies to teachers' own learning.

5. Monitoring, Evaluation & Feedback — regular observation and feedback from CSOs/HODs to check whether training is changing practice, directly responding to the finding that "monitoring" was the weakest-observed item on the classroom checklist. This follows Guskey's (2002) model, which argues that evaluation and feedback are what drive genuine improvement in teaching and learning.

6. Sustainability & Continuous Improvement — closes the loop by feeding monitoring results back into the next needs assessment, supported by adequate funding and ICT infrastructure. This is framed through SBTSS and Systems Theory, which hold that continuous, systematic support sustains improvement and builds lasting capacity.

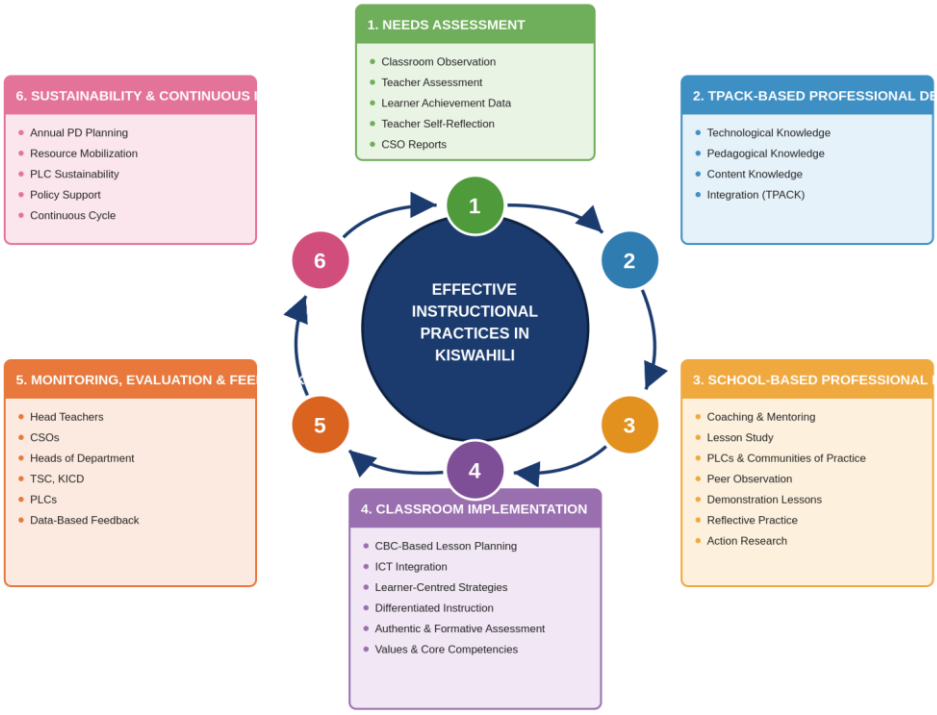


Figure 2 (Figure 4.8/4.9 in source): The Six-Stage Integrated TPACK–SBTSS Professional Development Framework (ITSPDF)

Triangulated Evidence Supporting the Framework Stages

Each stage of the proposed professional development framework is supported by three evidence strands: quantitative Need Indices and questionnaire descriptive statistics, thematic analysis of teacher and CSO interviews, and structured classroom observation across 36 lessons. The purpose of this triangulation is to justify the inclusion of each framework stage; it does not constitute a separate empirical validation study of the completed framework.

Table 3
(Table 4.29 in source): Framework Evidence Matrix

Framework Stage	Quantitative Evidence	Qualitative Evidence (Teachers/CSOs)	Classroom Observation Evidence	Triangulation Type
1. Needs Assessment	Need Index ranking establishes priority order: Technology 0.527, Content 0.391, Pedagogical 0.366	1 of 4 CSOs (25%) explicitly named needs assessment as the framework's starting stage	Not directly applicable — diagnostic stage precedes observation-based validation	Convergence
2. Technology Capacity-Building	Technology Need Index = 0.527, highest of the three	66.7% of teachers (8/12) cited infrastructure/connectivity gaps as their primary	Appropriate technology use recorded in 94.4% of lessons;	Convergence + Confirmation

Framework Stage	Quantitative Evidence	Qualitative Evidence (Teachers/CSOs)	Classroom Observation Evidence	Triangulation Type
	domains; digital resource adequacy M = 2.13/4; pre-service ICT preparation M = 3.27/5	challenge; 25% specifically requested AI training; 100% of CSOs named technology/ICT integration as a priority need	meaningful integration in 88.9%	
3. Content Knowledge Enrichment	Content Knowledge Need Index = 0.391; Ushairi (poetry) resource usage never exceeded 28.6% across 7 resource categories	0 of 12 teachers (0.0%) named poetry as a PLC-shared resource — the only content area absent; 50% requested more support for oral/integrated language skills	Ushairi recorded the lowest content-domain composite score (56.25%) of all eight topics observed; cultural references present in only 58.3% of lessons — the weakest item on the 22-item checklist	Convergence
4. Pedagogical Refinement	Pedagogical Need Index = 0.366, the lowest of the three domains	41.7% of teachers (5/12) requested CBE-aligned assessment training	Formative assessment (63.9%), constructive feedback (66.7%) and behaviour management (66.7%) were the three lowest-performing items on the checklist	Complementarity
5. Coaching, Mentoring and PLCs	Not directly captured by the Need Indices — a systems-level rather than domain-level need	83.3% named PLCs, peer observation and lesson study as a PD need; 83.3% independently named mentorship/coaching; 41.7% called for CSOs to shift from administrative supervision to instructional coaching; 100% of CSOs named coaching/mentoring/PLCs as a core support mechanism	Weakest observed practices — monitoring (58.3%), formative assessment (63.9%), behaviour management (66.7%) — indicate a need for sustained, in-practice support rather than one-off training	Complementarity
6. Resourcing and	Not directly captured by the Need	75% of CSOs named funding and ICT infrastructure as a	Clustering of the weakest observed items across all	Confirmation from Classroom Observation

Framework Stage	Quantitative Evidence	Qualitative Evidence (Teachers/CSOs)	Classroom Observation Evidence	Triangulation Type
Continuous Monitoring	Indices — a systems-level enabling condition	precondition for implementation; 100% of CSOs emphasized continuous/cyclical PD over one-off events; teachers' open-ended recommendations centered on government/institutional procurement of digital resources	three objectives — monitoring, formative assessment, behaviour management, cultural references — behaviorally confirms the need for sustained rather than one-off support	

Four of the six stages are corroborated by convergence across at least two evidence strands, and none rest on a single source alone. The strongest triangulation is at Stage 2 (Technology Capacity-Building), where the highest quantitative Need Index (0.527) is independently corroborated by teacher- and CSO-reported infrastructure gaps and confirmed behaviorally through classroom observation — a convergence-plus-confirmation pattern found nowhere else in the matrix. Stages 5 and 6 illustrate a complementary rather than convergent pattern: the domain-specific Need Indices do not directly capture systems-level needs such as coaching or resourcing, so qualitative and observational evidence carry more of the evidentiary weight. Classroom observation plays a confirmatory rather than a primary diagnostic role throughout — most clearly at Stage 6, where the clustering of the three weakest observation items behaviorally confirms, rather than independently generates, the need CSOs and teachers had already named.

Evidence-Based Appraisal of the Framework

Each stage of the proposed framework is appraised against four forms of supporting evidence: documented need, alignment with the study's theoretical foundations, recognition of relevance in teacher or CSO evidence, and correspondence with observed classroom practice where applicable. These criteria provide an evidence-based justification for the framework components rather than a separate formal validation of the completed framework.

Table 4

(Table 4.30 in source): Framework Evidence-Appraisal Matrix

Framework Stage	Content Validity	Construct Validity	Face Validity	Criterion Validity
1. Needs Assessment	Derived directly from the Need Index computation, not assumed — a data-driven ranking of Technology (0.527), Content (0.391) and	Consistent with Guskey's (2002) model of PD evaluation, which specifies baseline needs analysis as a	1 of 4 CSOs (25%) explicitly named needs assessment as the framework's starting stage	Not directly observable — validated indirectly by the consistency between the Need Index ranking and the interview/observatio

Framework Stage	Content Validity	Construct Validity	Face Validity	Criterion Validity
	Pedagogical (0.366) need	prerequisite to intervention design; also Adult Learning Theory (Knowles, 2020): PD must be needs-driven and problem-centered		n patterns confirmed at later stages
2. Technology Capacity-Building	Technology Need Index is the highest of the three domains (0.527); digital resource adequacy M = 2.13/4	Matches the Technological Knowledge component of Mishra and Koehler's (2006) TPACK model and Ertmer's (1999) first-order (resource) barriers framework	100% of CSOs named technology/ICT integration a priority; 66.7% of teachers cited infrastructure gaps as their primary challenge	Observed technology use was already high (94.4% appropriate, 88.9% meaningful) — confirming the constraint is access, not skill, which validates infrastructure as the correct target
3. Content Knowledge Enrichment	Ushairi (poetry) resource usage never exceeded 28.6% across all 7 categories; Content Knowledge Need Index = 0.391	Reflects Mishra and Koehler's (2006) distinction between content knowledge and pedagogical content knowledge — the 'how' a subject is represented, not just the 'what'	0 of 12 teachers (0.0%) named poetry as a PLC-shared resource beneficiary — the only content area absent from these accounts	Ushairi recorded the lowest content-domain composite score (56.25%) of all eight observed topics; cultural references were the weakest item on the entire 22-item checklist (58.3%)
4. Pedagogical Refinement	Pedagogical Need Index is the lowest overall (0.366), but this masks a specific sub-domain gap in assessment practice	Consistent with Guskey's (2002) argument that assessment-for-learning practices are typically the	41.7% of teachers (5/12) requested CBE-aligned assessment training	Formative assessment (63.9%), constructive feedback (66.7%) and behaviour management (66.7%) were the three lowest-performing

Framework Stage	Content Validity	Construct Validity	Face Validity	Criterion Validity
		most difficult component of teaching to embed, even where planning and delivery are strong		items on the checklist
5. Coaching, Mentoring and PLCs	Convergent, independently worded demand from teachers (83.3% PLCs, 83.3% mentorship) and CSOs (100%)	Grounded in Vygotsky's (1978) account of learning as socially mediated through interaction with more knowledgeable others, and Guskey's (2002) emphasis on continuous rather than one-off support	100% CSO endorsement; 41.7% of teachers explicitly called for CSOs to shift from administrative supervision to instructional coaching	The weakest observed practices — monitoring (58.3%) and formative assessment (63.9%) — are precisely the kind of in-practice gaps that sustained coaching, rather than one-off training, is positioned to close
6. Resourcing and Continuous Monitoring	75% of CSOs named funding and ICT infrastructure a precondition for implementation; teachers' open-ended recommendations centered on government/institutional procurement	Reflects Guskey's (2002) organizational-support level of PD evaluation and Desimone and Garet's (2015) criterion that effective PD requires sustained, resourced implementation	100% of CSOs emphasized continuous/cyclical PD over one-off events	The clustering of the weakest observed items across all three objectives — monitoring, formative assessment, behaviour management, cultural references — empirically confirms the systemic, sustained-support need this stage addresses

Each stage is traceable to a documented quantitative or qualitative need rather than an assumed one. Theoretical alignment is provided by TPACK (Mishra & Koehler, 2006), Guskey's (2002) model of professional development evaluation, Vygotsky's (1978) social constructivism, Adult Learning Theory (Knowles, 2020), Ertmer's (1999) barriers framework, and Desimone and Garet's (2015) work on sustained professional learning. Support from practitioner evidence varies across stages — for example, only one of four CSOs explicitly

named needs assessment as the framework's starting stage — and classroom observation provides direct support for implementation-related stages but cannot directly assess a diagnostic stage such as needs assessment.

Consolidated Evidence Matrix and Theoretical Grounding

Each component of the proposed framework is further supported by quantitative questionnaire results, qualitative interview themes from teachers and CSOs, classroom observation evidence, and the theoretical framework on which it draws.

Table 5

(Table 4.31 in source): Framework Evidence Matrix (Consolidated)

Framework Component	Quantitative Results (Questionnaire)	Interview Themes (Teachers & CSOs)	Classroom Observations	Underlying Theories/Frameworks
1. Needs Assessment	Need Index ranking: Technology 0.527 (highest), Content 0.391, Pedagogy 0.366 (lowest)	CSO: needs assessment named as the framework's starting stage (25%). Teachers: requested CBE-aligned assessment training (41.7%)	Monitoring observed in 58.3% of lessons; formative assessment 63.9%; feedback/behaviour management 66.7%. Learner participation and differentiation were strong (97.2%), showing gaps were specific rather than general	Adult Learning Theory (Knowles, 2020): PD must be needs-driven and problem-centered
2. TPACK-Based Professional Development	Technology Need Index highest of the three domains (0.527); digital resource adequacy M = 2.13/4; pre-service ICT preparation M = 3.27/5; only 23.4% of teachers used AI tools; Ushairi usage never	CSO: technology/ICT integration a priority (100%); TPACK explicitly cited (50%). Teachers: infrastructure/connectivity gaps (66.7%); AI training requested (25%); 100% cited resource inadequacy as primary content-area challenge; 41.7% requested CBE-aligned assessment training	Meaningful technology integration 88.9%, appropriate use 94.4% — high once available, confirming access rather than skill is the constraint. Ushairi recorded the lowest content-domain composite score (56.25%); Sarufi lessons showed frequent resource use (77.8%) but zero cultural-	TPACK (Mishra & Koehler, 2006): integration of Technology, Pedagogy and Content is essential for effective teaching

Framework Component	Quantitative Results (Questionnaire)	Interview Themes (Teachers & CSOs)	Classroom Observations	Underlying Theories/Frameworks
	exceeded 28.6%		reference incorporation	
3. School-Based Professional Learning (SBTSS)	Strong teacher preference for mentoring, coaching, peer observation and PLCs (M = 3.70)	CSO: coaching, mentoring and PLCs the core support mechanism (100%). Teachers: PLCs/peer observation/lesson study named by 83.3% — corroborating the CSO theme with teacher-voice evidence	Support in preparation/delivery observed in 97.2% of lessons, but monitoring in only 58.3%; the checklist cannot directly measure peer coaching, lesson study or PLC activity, so it speaks only to general preparatory support	Social Constructivism (Vygotsky, 1978): learning occurs through social interaction, collaboration and community
4. Classroom Implementation	Pedagogical Need Index lowest of the three domains (0.366), indicating comparative strength in current pedagogical practice	CSO: learner-centered, competency-based pedagogy named as foundational (100%). Teachers: primary method reported as learner-centered/active (100%); large class size (25.0%) and learner discipline (16.7%) cited as top classroom-management challenges	Teaching Strategies averaged 92.5% across 7 items; Assessment & Feedback averaged only 68.5% — the weakest section; behaviour management (66.7%) and monitoring (58.3%) markedly weaker than near-universal lesson-planning items (97.2–100%)	Constructivism (Vygotsky, 1978) & CBE Principles: learners actively construct knowledge through meaningful experiences
5. Monitoring, Evaluation & Feedback	Teachers agreed regular monitoring and feedback improve practice (M = 3.63)	CSO: continuous/cyclical PD (100%); multi-stakeholder collaboration required (100%). Teachers: 58.3% requested CSO/HOD observation with feedback; 41.7% called for a shift from	"Monitoring" observed in 21/36 lessons (58.3%) — the weakest-performing item on the full 23-item observation record, alongside cultural references	Guskey's (2002) Model: evaluation leads to improvements in teaching and learning

Framework Component	Quantitative Results (Questionnaire)	Interview Themes (Teachers & CSOs)	Classroom Observations	Underlying Theories/Frameworks
		administrative supervision to instructional coaching		
6. Sustainability & Continuous Improvement	Teachers agreed PD should be ongoing and embedded in schools (M = 3.64)	CSO: funding/ICT infrastructure a precondition (75%). Teachers: infrastructure/connectivity gaps (66.7%); 100% emphasized continuous/cyclical PD over one-off events	Resource-related items: appropriate instructional materials 97.2%, appropriate teaching aids 83.3%. Clustering of the weakest observed items across all three objectives confirms the need for sustained rather than one-off support	SBTSS & Systems Theory (2020): continuous, systematic support sustains improvement and builds capacity

Read alongside Tables 3 and 4 above, this consolidated matrix shows that the framework components are supported by multiple forms of evidence, although the strength and type of support differ by stage. Technology capacity-building draws on the strongest combination of quantitative, qualitative and observational evidence. School-based professional learning is supported strongly by teacher and CSO evidence, while classroom observation serves only as an indirect indicator because the checklist did not directly measure structured peer coaching, lesson study or PLC activity. Taken together, the matrices provide an evidence-based justification for the proposed framework without claiming that the completed framework was independently validated through a separate implementation study.

Summary of Triangulated Findings

This final matrix consolidates findings from the three data sources — questionnaires, interviews and classroom observations — across six thematic areas: needs assessment, TPACK-based PD, school-based learning, classroom implementation, monitoring and feedback, and sustainability. For each theme it presents the quantitative results, key interview themes, observation findings, relevant theory and measurable indicators, allowing the consistency of evidence across sources to be seen at a glance and providing the empirical basis for the discussion that follows.

Table 6
(Table 4.32 in source): Framework Validation Matrix

FRAMEWORK VALIDATION MATRIX

FRAMEWORK COMPONENT	QUANTITATIVE RESULTS (QUESTIONNAIRE) (Mean Scores M)	INTERVIEW THEMES (TEACHERS & CSO)	CLASSROOM OBSERVATIONS (Key Findings)	UNDERLYING THEORIES / FRAMEWORKS	KEY INDICATORS (MEASURABLE)
1. Needs Assessment	High need for: ICT integration (M=3.62), Assessment (M=3.52), CBC lesson planning (M=3.40), Teacher support in school-based PD (M=3.44). (See Tables 4.7–4.13)	CSOs: start with teacher needs assessment; continuous monitoring and feedback. Teachers: need more PD in ICT, assessment, differentiation, content.	Lessons showed weak ICT integration, limited assessment strategies, and insufficient learner-centred approaches.	Adult Learning Theory (Knowles); PD must be needs-driven and problem-centred.	Needs assessment tools used; % teachers assessed; PD plans based on needs data.
2. TPACK-Based Professional Development	Strong need for technological (M=3.62), pedagogical (M=3.67), and content knowledge (M=2.83). (See Tables 4.9–4.13)	Teachers: need training in digital tools, AI, learner-centred methods, grammar, oral literature, integrated skills. CSO: framework must address all TPACK domains.	Teachers mostly used traditional methods; limited use of digital resources and interactive tools.	TPACK (Mishra & Koehler, 2006): integration of Technology, Pedagogy and Content Knowledge.	TPACK competence scores; % teachers trained; pre/post test improvement.
3. School-Based Professional Learning (SBTSS)	Teachers strongly agreed that they prefer mentoring, coaching, peer observation, and PLCs (M=3.70). (See Table 4.19)	CSO: emphasize coaching, mentoring, lesson study, PLCs. Teachers: value collaboration and peer learning.	Teachers worked in isolation; limited peer support and lesson study.	Social Constructivism (Vygotsky): learning occurs through social interaction, collaboration and community.	Number of PLC meetings; mentoring sessions; lesson study cycles completed.
4. Classroom Implementation	High need for learner-centred methods (M=3.67), assessment (M=3.52), and ICT use (M=3.62). (See Tables 4.12–4.13)	Teachers reported use of group work, debates, storytelling, videos, digital quizzes; need more support for CBC lesson planning.	Lessons varied; some used group work, and videos, others used lecture method; assessment often teacher-centred.	Constructivism & CBC Principles: learners actively construct knowledge through meaningful experiences.	% lessons with learner-centred strategies; ICT use frequency; CBC-aligned lesson plans.
5. Monitoring, Evaluation & Feedback	Teachers agreed that regular monitoring and feedback improve practice (M=3.63). (See Table 4.13)	CSO: monitoring by CSOs, HoDs, HTs and PLCs is essential for improvement.	Feedback to teachers was irregular; poor documentation of learning outcomes.	Guskey's Model (2002): evaluation leads to improvement in teaching and learning.	Monitoring visits conducted; feedback reports; improvement plans tracked.
6. Sustainability & Continuous Improvement	Teachers agreed PD should be ongoing and embedded in school (M=3.64). (See Table 4.19)	CSO: institutionalize annual PD planning. PLC sustains collaboration and resource mobilisation. Teachers need ongoing internet access and resources.	Lack of resources, electricity, internet and PD funds hinder continuity.	SBTSS & Systems Theory: continuous, systematic PD sustains improvement and builds capacity.	Annual PD plan; resource availability; infrastructure improvements.

KEY: M = Mean Response (1 = Strongly Disagree, 4 = Strongly Agree) CSO = Curriculum Support Officer H OD = Head of Department HT = Head Teacher PD = Professional Development PLC = Professional Learning Community CBC = Competency -Based Curriculum ICT = Information & Communicatio n Technology

Discussion: The Integrated TPACK–SBTSS Professional Development Framework (ITSPDF)

Professional Development Support and Framework Requirements

Objective Four established strong support for a continuous, collaborative, and school-embedded professional development model. All four CSOs emphasized learner-centered competency-based pedagogy, technology integration, coaching and mentoring through Professional Learning Communities (PLCs), multi-stakeholder collaboration, and continuous rather than one-off professional development. Three of the four CSOs (75%) identified funding and ICT infrastructure as critical enabling conditions. Teacher evidence converged with this view: 83.3% named PLCs, peer observation and lesson study as professional development needs; another 83.3% requested mentorship or coaching by experienced teachers or CSOs; and 41.7% specifically called for CSOs to shift from predominantly administrative supervision towards instructional coaching.

The clustering of the weakest observed practices — monitoring, formative assessment, behaviour management and cultural integration — supports a model in which teachers receive follow-up support while implementing new practices. Effective professional development is more likely to influence classroom practice when it is content-focused, active, collaborative, supported by coaching and sustained over time (Darling-Hammond et al., 2017). Consequently, the framework proposed by this study is cyclical and school-based, with monitoring results feeding into renewed needs assessment.

The Framework: Structure and Theoretical Integration

The study developed the Integrated TPACK–School-Based Teacher Support System Professional Development Framework (ITSPDF) to provide an evidence-informed approach for addressing the professional development needs of Junior School Kiswahili teachers. The framework was derived from findings from the combined questionnaire, teacher interviews,

CSO interviews, and classroom observations, which established that technological knowledge had the highest mean Need Index (M = 0.527), followed by content knowledge (M = 0.391) and pedagogical knowledge (M = 0.366). Technology therefore requires particular attention within professional development, although the three knowledge domains remain interconnected.

TPACK provides the principal theoretical structure for the framework because the study examined teachers' technological, pedagogical and content knowledge and the relationships among these areas (Mishra & Koehler, 2006). The framework also incorporates school-based professional learning through SBTSS and draws on adult-learning, social-constructivist and professional-development evaluation principles to support needs identification, collaboration, classroom implementation and continuous feedback. Among interviewed teachers, 83.3% identified PLCs, peer observation and lesson study as desirable professional-learning approaches, while 83.3% also identified mentorship or coaching by experienced teachers or CSOs; the framework therefore extends professional development beyond attendance at centralized workshops by incorporating sustained support within teachers' working environments.

The resulting framework comprises six interconnected stages: Professional Development Needs Assessment; TPACK-Based Professional Development; School-Based Professional Learning through SBTSS; Classroom Implementation; Monitoring, Evaluation and Feedback; and Sustainability and Continuous Improvement. The final stage reconnects with needs assessment so that professional development functions as a recurring improvement process rather than a single training event.

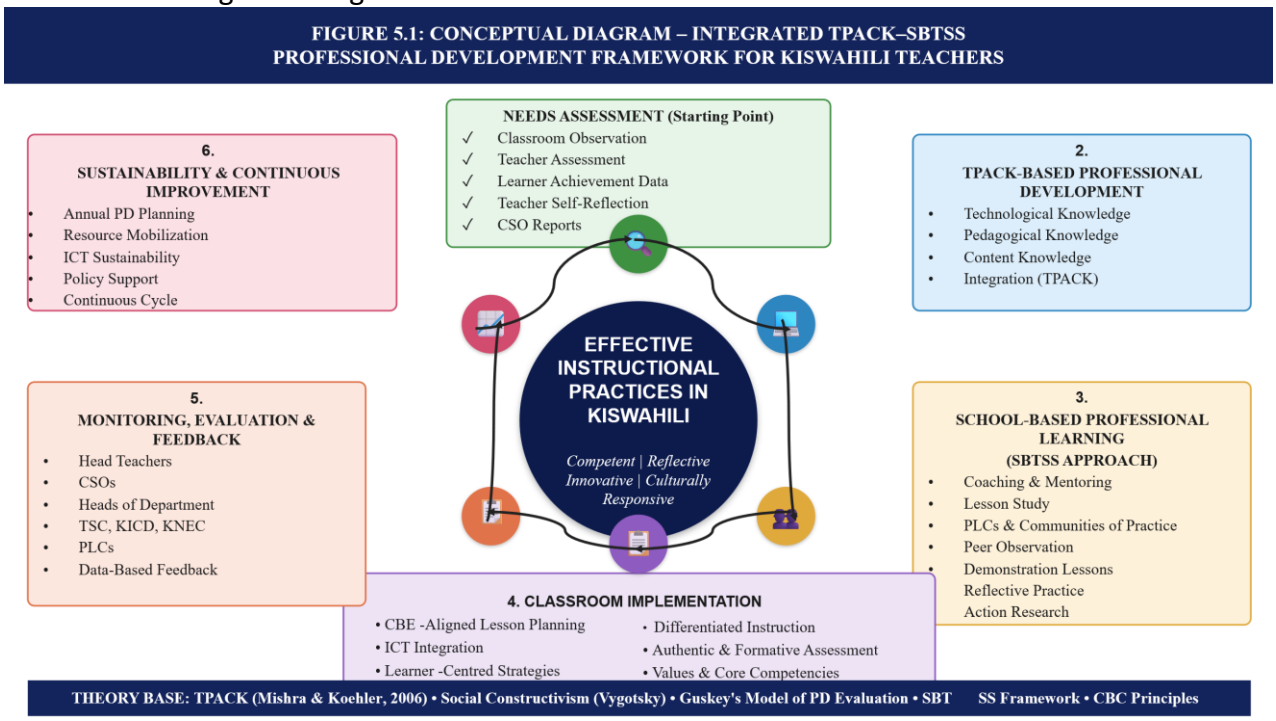


Figure 3 (Figure 5.1 in source): Conceptual Diagram — Integrated TPACK–SBTSS Professional Development Framework for Kiswahili Teachers

Source: Developed by the researcher (2026), based on the findings of the present study and adapted from Mishra and Koehler (2006), SBTSS principles, and CBE implementation requirements.

Stage One: Professional Development Needs Assessment

The first stage is a systematic professional development needs assessment establishing the actual gaps that should inform subsequent training, rather than assuming all Kiswahili teachers require identical professional development. It should incorporate classroom observation, teacher self-assessment, learner achievement data, teacher reflection, CSO reports, and analysis of available teaching and learning resources. This stage matters because the study revealed differences in the magnitude of teachers' needs (Technology 0.527, Content 0.391, Pedagogy 0.366); programmes should therefore allocate resources according to demonstrated needs while maintaining an integrated TPACK orientation. The stage is also consistent with adult-learning principles, since professional learning is more relevant when it responds to problems practitioners recognize in their own work (Knowles et al., 2020), and should recur periodically as curriculum expectations, learner characteristics and technologies evolve, producing an updated needs profile that feeds Stage Two.

Stage Two: TPACK-Based Professional Development

The second stage provides targeted professional development integrating Technological, Pedagogical and Content Knowledge, demonstrating how the three domains interact in actual Kiswahili lessons rather than running separate ICT, teaching-method and content workshops. This stage is strongly supported because technological knowledge represented the greatest overall need: digital-resource adequacy averaged only 2.13/4, only 23.4% of teachers used AI tools, 66.7% identified infrastructure/connectivity challenges, and 25% specifically requested AI-related training. Training should cover digital content creation, multimedia, digital assessment, AI-supported teaching, and online/offline resources — always linked to specific Kiswahili learning outcomes (e.g., video supporting Ushairi, Fasihi or Kusikiliza na Kuzungumza) — reflecting TPACK's central argument that effective teaching requires understanding the relationships among technology, pedagogy and content (Mishra & Koehler, 2006).

Stage Three: School-Based Professional Learning through SBTSS

The third stage moves professional development from occasional centralized workshops into teachers' everyday professional environment through coaching, mentoring, Professional Learning Communities, Communities of Practice, peer observation, lesson study, demonstration lessons, reflective practice and action research. This is strongly supported by the data: 83.3% of interviewed teachers identified PLCs, peer observation and lesson study as important, 83.3% also identified mentorship or coaching, and all four CSOs emphasized coaching, mentoring and PLCs as essential support mechanisms. PLCs can operate at school, zonal, sub-county and subject levels, with teachers collaboratively developing lesson plans, assessment tools and resources; the stage is theoretically supported by Vygotsky's Social Constructivism, which emphasizes learning through interaction and collaborative knowledge construction (Vygotsky, 1978).

Stage Four: Classroom Implementation

Professional development becomes meaningful when teachers transfer acquired competencies into classroom practice through CBE-aligned lesson planning, ICT integration, learner-centered teaching, differentiated instruction, authentic and formative assessment, and development of core competencies. The study found considerable existing strength — clear learning objectives and well-organized lesson plans in 100% of observed lessons, differentiation and learner participation in 97.2%, and varied teaching strategies in 94.4% — providing a foundation to build on. However, formative assessment (63.9%), constructive feedback (66.7%), behaviour management (66.7%) and monitoring (58.3%) were less consistently demonstrated and require particular attention, with training expected to translate into observable use of questioning, learner self- and peer-assessment, rubrics and feedback that informs subsequent teaching.

Stage Five: Monitoring, Evaluation and Data-Based Feedback

The fifth stage establishes mechanisms — involving CSOs, head teachers, HODs, TSC, KICD and PLCs, with emphasis on supportive rather than punitive supervision — for determining whether professional development has actually influenced instructional practice. This is particularly important because monitoring was observed in only 58.3% of lessons, and 41.7% of teachers explicitly called for CSOs to move from administrative supervision towards instructional coaching. Monitoring should involve classroom observation, review of lesson plans and assessment records, teacher reflection, analysis of learner work, coaching conferences and agreed improvement targets, drawing on Guskey's (2002) model for examining professional learning at progressively broader levels — from teacher experience and learning through to implementation and learner outcomes.

Stage Six: Sustainability and Continuous Improvement

The sixth stage ensures professional development becomes an established feature of school improvement rather than an occasional intervention, requiring annual PD planning, resource mobilization, ICT sustainability, policy support, functioning PLCs and continuous monitoring. This is strongly supported by CSO findings: all four emphasized that PD should be continuous and cyclical, while 75% identified funding and ICT infrastructure as essential conditions. Most importantly, Stage Six feeds directly back into Stage One — monitoring and evaluation may reveal new needs, triggering another needs assessment, so that professional development becomes a continuous improvement cycle rather than a linear programme with a fixed endpoint.

Logic Model Underpinning the Framework

The framework is complemented by a logic model illustrating how professional development resources and interventions are expected to generate outputs, outcomes and ultimately educational impact, represented as: Inputs → Activities → Outputs → Outcomes → Impact.

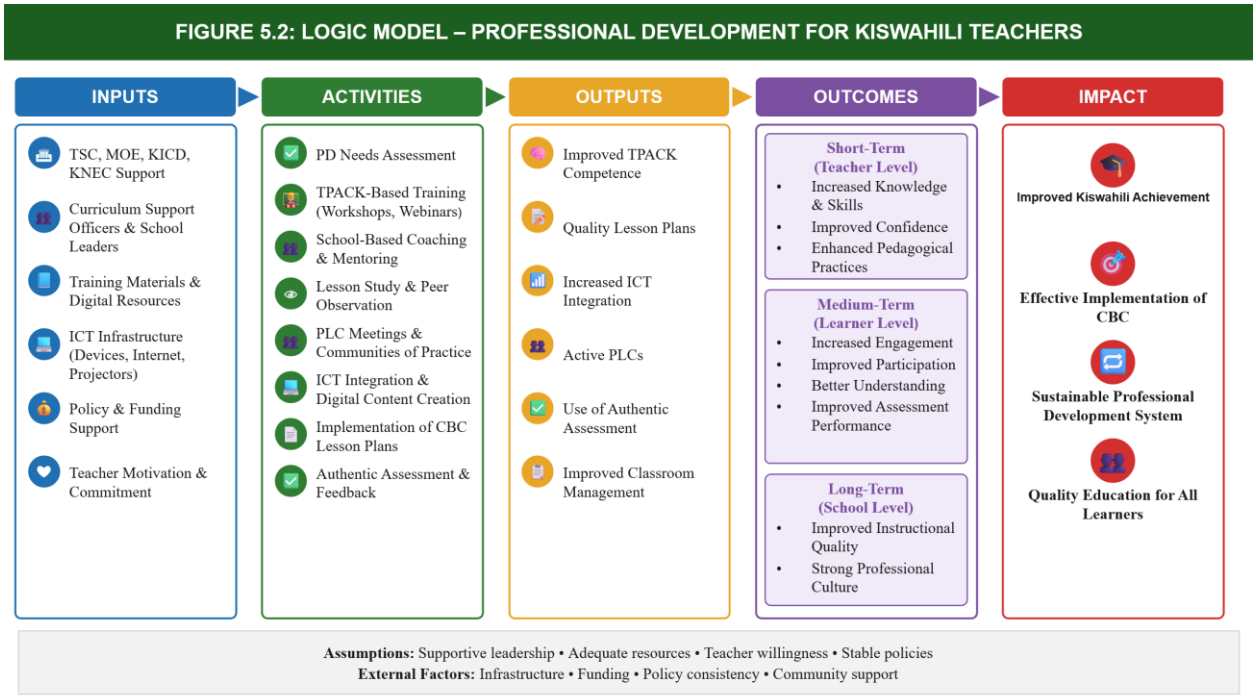


Figure 4 (Figure 5.2 in source): Logic Model — Professional Development for Kiswahili Teachers

Inputs: support from TSC, the Ministry of Education, KICD and KNEC; CSOs and school leaders; training materials and digital resources; ICT infrastructure; policy and financial support; and teacher motivation and commitment. ICT infrastructure is particularly important because 66.7% of interviewed teachers identified infrastructure/connectivity as their primary technological challenge.

Activities: needs assessment, TPACK-based workshops, school-based coaching and mentoring, lesson study, peer observation, PLC meetings, ICT integration, digital content creation, CBE lesson planning, authentic assessment and feedback — reflecting the CSOs' unanimous position that effective PD should combine learner-centered pedagogy, technology integration, coaching, mentoring, collaboration and continuous learning.

Outputs: improved TPACK competence, higher-quality lesson plans, increased ICT integration, active PLCs, greater use of authentic assessment and improved classroom management — measurable through lesson plans, digital resources, assessment tools, PLC records and observation reports.

Outcomes: at the short-term teacher level, increased knowledge/skills, confidence and pedagogical practice; at the medium-term learner level, greater engagement, participation, understanding and assessment performance; at the long-term school level, stronger instructional quality and a sustainable professional learning culture — consistent with Guskey's (2002) proposition that PD should ultimately be evaluated in terms of its influence on classroom practice and learner outcomes.

Impact: improved Kiswahili achievement, effective CBE implementation, a sustainable teacher professional development system, and improved quality of education for learners —

while recognizing that infrastructure, school leadership, policy support, instructional resources and learner-related factors also influence achievement.

Theoretical Integration and Overall Interpretation

The proposed ITSPDF uses TPACK as its principal theoretical foundation because the study examined professional development needs across technological, pedagogical and content knowledge; TPACK therefore determines which professional knowledge requires development, while additional perspectives explain how that development can be organized and sustained. Adult-learning principles support using teachers' identified classroom needs and professional experience as a starting point (Knowles et al., 2020). Social Constructivism supports the collaborative elements of the framework, including mentoring, PLCs, lesson study and peer learning (Vygotsky, 1978), while Guskey's professional-development evaluation model contributes to monitoring and feedback by directing attention to whether professional learning is translated into classroom practice and associated with learner outcomes (Guskey, 2002). SBTSS provides the practical school-based structure through which these principles can operate continuously, while CBE maintains the framework's focus on learner-centered instruction, competency development, assessment, values and active participation. The theories are not treated as separate competing models; each performs a specific function within the framework.

The proposed ITSPDF conceptualizes professional development as a continuous process linking identified need with professional learning, classroom application and feedback: teachers' needs are first established using evidence; appropriate TPACK-focused support is then provided; school-based learning through PLCs, coaching and mentoring reinforces implementation; classroom practice is monitored; and the evidence generated determines subsequent professional-development priorities. The cyclical structure is intended to make professional development responsive to both broad TPACK priorities and specific classroom practices requiring continuing support. The framework can be summarized as:

Needs Assessment → Integrated TPACK Professional Development → SBTSS/PLCs and Coaching → Classroom Implementation → Monitoring, Evaluation and Feedback → Sustainability and Continuous Improvement → Renewed Needs Assessment

Through this cycle, professional development becomes needs-driven, Kiswahili-specific, collaborative, classroom-embedded, evidence-informed, and responsive to changes in teachers' professional needs.

Framework Implementation Matrix

To operationalize the six-stage framework, each stage is translated into a practical implementation matrix specifying the key activities to be undertaken, the lead actors responsible, the evidence or indicators that can verify implementation, and the expected result. This structure moves the framework beyond a conceptual model into an actionable guide that CSOs, head teachers, HODs and teachers can use to plan, monitor and evaluate professional development within their schools and zones, while also strengthening accountability by explicitly linking activities to responsible actors and measurable evidence.

Table 7
(Table 5.1 in source): Framework Implementation Matrix

Framework Stage	Key Activities	Lead Actors	Evidence/Indicators	Expected Result
1. Needs Assessment	Teacher self-assessment; observation; resource audit; review of learner evidence	CSOs, HODs, teachers	Updated TPACK needs profile; priority list	PD responds to demonstrated needs
2. TPACK-Based PD	ICT/AI; digital assessment; CBE pedagogy; content enrichment	TSC, MOE, KICD, CSOs, trainers	Training modules; teacher products; participation records	Improved integrated TPACK competence
3. School-Based Learning	PLCs; coaching; lesson study; peer observation; mentoring	CSOs, HODs, mentors, teachers	PLC minutes; lesson-study records; coaching logs	Sustained collaborative professional learning
4. Classroom Implementation	Technology-supported lessons; differentiation; authentic/formative assessment	Teachers, HODs	Lesson plans; learner work; observation evidence	Improved instructional practice and engagement
5. Monitoring & Feedback	Observation; coaching conferences; review of learner evidence	CSOs, HODs, head teachers	Observation records; feedback plans; progress evidence	Practice gaps identified and corrected
6. Sustainability & Improvement	Annual PD plan; budgeting; ICT maintenance; resource sharing; renewed assessment	School leaders, TSC, MOE, CSOs	PD budget; functional ICT; active PLCs; next needs profile	Institutionalized continuous improvement

Practical Application of the Framework

The practicality of the ITSPDF can be demonstrated by applying each of its components directly to the empirical findings of the present study. The framework is not presented merely as a theoretical sequence: the quantitative, qualitative and classroom-observation findings identify the professional development problem, indicate the form of intervention required, show the school-based support structures preferred by teachers and CSOs, and provide observable indicators through which improvement can be monitored — converting the study's findings into an operational professional development process within the existing education system.

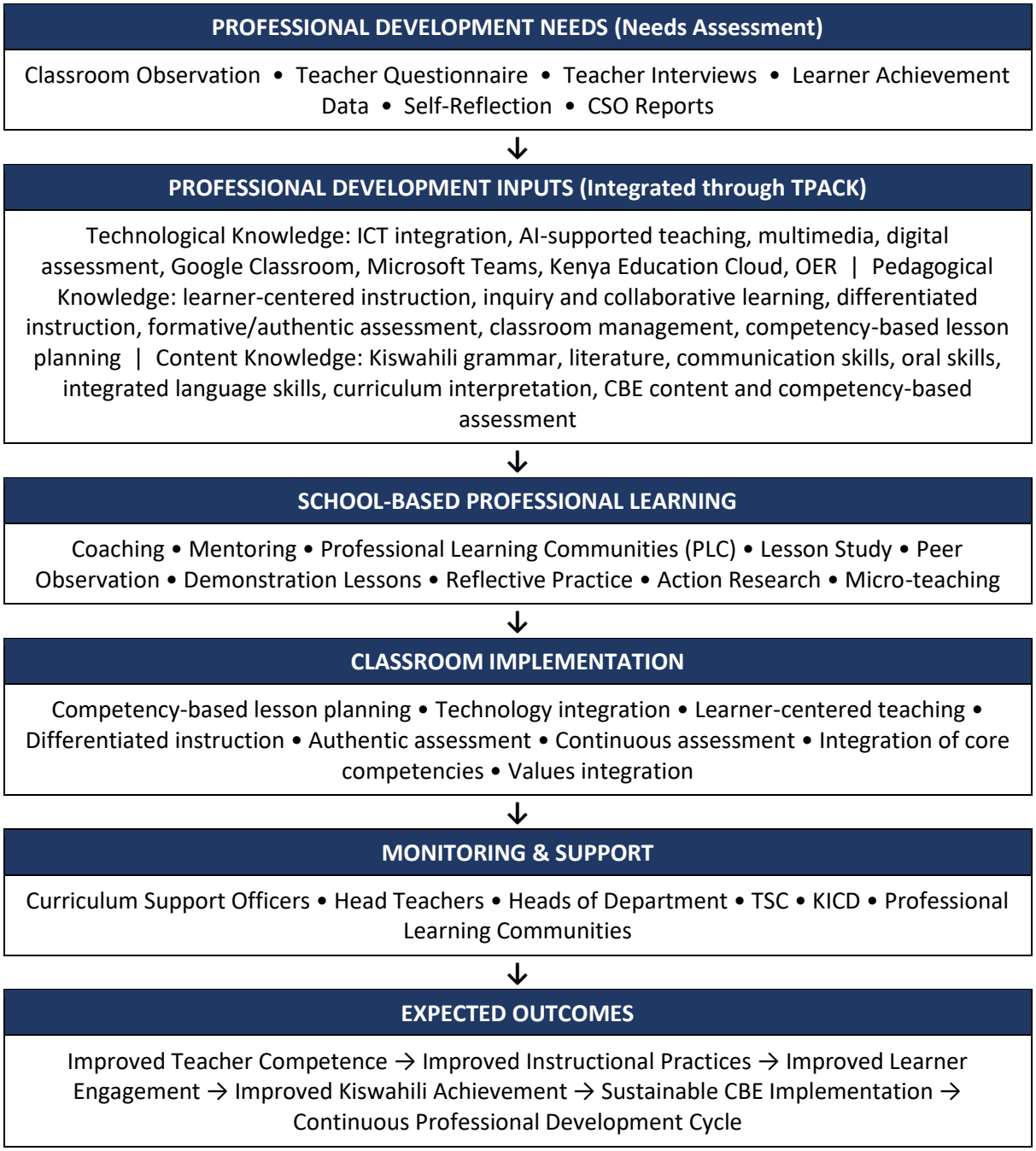


Figure 5 (Figure 5.3 in source): Practical Application of the Integrated TPACK–SBTSS Professional Development Framework

Source: Developed by the researcher (2026), adapted from Mishra & Koehler (2006), SBTSS, CBE, and findings of the present study.

Needs Assessment as the Entry Point

In the present study, the three professional development domains were not equally distributed: the Technology Need Index was 0.527, the Content Knowledge Need Index was 0.391, and the Pedagogical Need Index was 0.366. Technology therefore represented the greatest overall need, followed by content and pedagogy. This demonstrates how the framework can be used in practice — CSOs, HODs and teachers can use questionnaires, interviews, classroom observations, learner evidence and self-reflection to establish which domain should receive priority rather than exposing all teachers to identical training.

Triangulation is particularly important because aggregate indices did not reveal every instructional weakness: pedagogy recorded the lowest overall Need Index, yet classroom observation showed monitoring in only 58.3% of lessons, formative assessment in 63.9%, constructive feedback in 66.7% and behaviour management in 66.7%.

Practical Response to the Technological Knowledge Findings

Technological professional development should be the first major priority. Teachers rated their pre-service technological preparation as only moderately adequate (M = 3.27), while school-based digital resources were below the adequate level (M = 2.13); reading (Kusoma) was consistently the least technology-supported language skill. YouTube (79.2%) and Google (76.6%) were the most commonly used applications, whereas adoption of AI tools was only 23.4%; 66.7% of teachers identified infrastructure and connectivity as their main technological challenge, and 25% specifically requested AI-related training. Rather than general computer-literacy workshops, CSOs and trainers can organize Kiswahili-specific sessions on digital resources for each language area, multimedia development, digital assessment, and responsible AI use. Because classroom observation showed appropriate technology use in 94.4% of lessons and meaningful integration in 88.9% where technology was present, the framework should combine training with improved access to infrastructure, since access and depth of use — not unwillingness — are the major constraints.

Practical Response to the Pedagogical Knowledge Findings

The Pedagogical Need Index of 0.366 indicates pedagogy was comparatively stronger than technology and content, supported by teacher interviews reporting learner-centered/active teaching by all interviewed teachers and generally strong observed teaching-strategy practice. The framework should therefore avoid repeating broad generic pedagogy workshops and instead target the specific practices shown to be weaker: a practical intervention would focus on formative assessment, constructive feedback, classroom monitoring and behaviour management — for example, a school-based session in which teachers design CBE-aligned formative assessment tasks, practice oral and written feedback, and develop strategies for managing large or diverse classes, supported by the finding that 41.7% of interviewed teachers specifically requested CBE-aligned assessment training, followed by demonstration in a real lesson and peer or CSO feedback.

Practical Response to the Content Knowledge Findings

The Content Knowledge Need Index of 0.391 indicates a moderate but important need for continued subject-specific development. All 12 interviewed teachers identified inadequacy of print or digital resources as a primary content challenge; half requested additional support in oral and integrated language skills, while 16.7% requested support in Fasihi and 16.7% in grammar. Ushairi provides a particularly clear example, recording the lowest content-domain composite score (56.25%) among the topics observed: the framework can organize a subject-focused professional learning activity in which teachers strengthen poetry content knowledge, develop learner-centered approaches to interpretation and performance, and identify appropriate print, audio, video or locally available resources. In Sarufi, frequent resource use but weak cultural contextualization suggest professional development should emphasize contextualized examples and culturally responsive language teaching rather than resource use alone.

Operationalizing ITSPDF through Teachers' Preferred Professional Learning Approaches

The school-based component is strongly supported by the data: 83.3% of interviewed teachers identified PLCs, peer observation and lesson study as professional development needs, the same proportion identified mentorship or coaching, and CSOs unanimously identified coaching, mentoring and PLCs as core support mechanisms. In practice, Kiswahili teachers within a school, zone or sub-county can identify a common need — such as formative assessment, Ushairi, oral language or technology-supported reading — and address it through a PLC: teachers jointly plan a lesson, one demonstrates it, colleagues observe learner responses, and the group revises the lesson, with a more experienced teacher, CSO or subject expert providing mentoring.

Classroom Implementation, Monitoring and Instructional Coaching

The framework requires every intervention to culminate in classroom implementation. Learner-centered/active teaching was strongly represented and lesson preparation/delivery support was observed in 97.2% of lessons; however, assessment and feedback were weaker than teaching-strategy practices, and monitoring occurred in only 58.3% of lessons. Monitoring and support are essential because of this gap between preparation and sustained follow-up: 58.3% of interviewed teachers explicitly requested CSO/HOD observation with constructive feedback, and 41.7% called for a shift from administrative supervision towards instructional coaching. The framework addresses this by structuring CSO and HOD visits around developmental observation — agreeing one or two indicators (e.g., formative assessment, learner engagement, technology integration), recording evidence, conducting a post-observation coaching discussion, and reviewing the resulting improvement target at a subsequent visit.

Sustainability within the Existing Education System

Teachers agreed that professional development should be ongoing and embedded in schools (M = 3.64), and that regular monitoring and feedback was important (M = 3.63). CSOs emphasized continuous and cyclical PD and multi-stakeholder collaboration, and 75% identified funding and ICT infrastructure as preconditions for successful implementation. Practically, head teachers and HODs can schedule PLC and lesson-study time and coordinate access to ICT resources; CSOs can coordinate zonal or sub-county coaching; TSC can use aggregated needs evidence to inform priorities; and KICD can support curriculum interpretation and curriculum-aligned exemplars. The framework therefore relies largely on existing education structures but organizes their activities around a continuous, evidence-based professional development cycle.

Data-Based Demonstration of the Framework

Table 8

(Table 5.2 in source): Data-Based Demonstration of the Framework

Study Finding	Identified Need	ITSPDF Response	Practical Kiswahili Application	Indicator of Improvement
Technology Need Index = 0.527; digital resources M = 2.13; infrastructure/connectivity challenge = 66.7%; AI use = 23.4%.	Technology access, depth of integration and emerging digital competence.	TPACK-based technology training plus resource/infrastructure support.	Digital resources for integrated language skills; multimedia; digital assessment; responsible AI-supported preparation.	Greater purposeful technology use across Kiswahili skills and improved access to resources.
Pedagogical Need Index = 0.366; formative assessment = 63.9%; constructive feedback = 66.7%; monitoring = 58.3%.	Targeted assessment, feedback and responsive teaching support.	CBE-focused pedagogy, coaching and classroom follow-up.	Kiswahili formative tasks, rubrics, peer/self-assessment, feedback and adjustment of instruction.	More frequent formative assessment, constructive feedback and evidence-based instructional adjustment.
Content Need Index = 0.391; all 12 interviewees cited resource inadequacy; 50% requested oral/integrated-language support.	Subject-specific content and resource development.	Content enrichment integrated with pedagogy and technology.	Oral skills, integrated language skills, Fasihi, Sarufi and curriculum interpretation.	Improved content presentation and broader use of appropriate instructional resources.
Ushairi composite = 56.25%, lowest observed content-domain score.	Focused support in Ushairi.	PLC/lesson study integrating CK, PK and TK.	Collaborative poetry lesson planning, recitation, interpretation and appropriate multimedia/print resources.	Improved teacher competence and learner participation/performance in Ushairi.
PLCs/peer observation/lesson study = 83.3%; mentoring/coaching = 83.3%.	Continuous collaborative professional learning.	SBTSS through PLCs, mentoring, lesson study and peer observation.	School/zonal Kiswahili PLCs addressing identified	Documented PLC activity, revised lessons, peer feedback and shared resources.

Study Finding	Identified Need	ITSPDF Response	Practical Kiswahili Application	Indicator of Improvement
			classroom problems.	
58.3% requested CSO/HOD observation with feedback; 41.7% requested more instructional coaching.	Developmental monitoring and feedback.	Observation–coaching–follow-up cycle.	CSO/HOD observes an agreed Kiswahili practice and conducts a coaching conference.	Documented improvement targets and evidence of progress in subsequent lessons.
PD embedded in schools M = 3.64; monitoring/feedback M = 3.63; 75% of CSOs cited funding/ICT infrastructure.	Sustainability and institutional support.	Continuous cycle linked to school planning, infrastructure and multi-stakeholder support.	Termly needs review, PLC schedule, resource planning and follow-up.	Sustained PD activities and renewed needs profiles.

Using the study evidence, the practical operation of the framework can be illustrated as follows: a needs assessment identifies technology as the highest overall need (0.527); more detailed evidence shows inadequate digital resources (M = 2.13), low AI adoption (23.4%), infrastructure/connectivity challenges (66.7%), and particularly weak technological support for reading. A TPACK-based intervention is designed around purposeful digital-resource use in Kiswahili; teachers practice through PLCs, mentoring, peer observation or lesson study (supported by 83.3% of interviewed teachers); the new practice is implemented in a lesson; a CSO or HOD observes and provides constructive feedback, responding to the expressed need for stronger instructional coaching; learner work and classroom evidence are reviewed; and any remaining difficulty becomes the next professional development need — demonstrating the cyclical movement from empirical evidence to intervention, implementation, evaluation and renewed needs assessment.

The ITSPDF is therefore practical because every major component can be traced to evidence generated by the present study: the needs-assessment stage is justified by the unequal TPACK Need Indices; the technology component responds to resource, connectivity and AI-related gaps; the pedagogical component addresses formative assessment, feedback, monitoring and classroom management; the content component responds to Ushairi, oral/integrated language skills and resource inadequacy; SBTSS reflects teachers' and CSOs' preference for PLCs, mentoring and coaching; and the monitoring component responds directly to the observed and reported need for instructional follow-up. Accordingly, the framework does not simply state that Kiswahili teachers require professional development — it provides a practical pathway through which the specific gaps established in Nyamache Sub-County can be addressed within existing education structures: study evidence and needs assessment → prioritized TPACK professional development → SBTSS-based collaborative learning → classroom application → CSO/HOD coaching and monitoring → review of teacher and learner evidence → renewed needs assessment.

Expected Outcomes of the Framework

If implemented consistently, the framework is expected to strengthen teachers' integrated TPACK competence, increase access to and purposeful use of digital resources, improve assessment and feedback practices, deepen difficult Kiswahili content areas, strengthen collaborative professional learning, and improve learner engagement. Over time, these changes are expected to contribute to stronger Kiswahili instructional quality, improved learner achievement, and more sustainable implementation of Competency-Based Education.

Conclusions and Recommendations

Conclusion

Overall, effective Kiswahili instruction cannot be improved by addressing technology, pedagogy or content in isolation. The findings support an integrated TPACK approach in which teachers identify their needs, receive targeted training, practise new competencies in school-based professional learning structures, implement them in real classrooms, receive coaching and feedback, and use evaluation evidence to begin another improvement cycle. This conclusion reflects the central proposition of TPACK (Mishra & Koehler, 2006) and the evidence from teachers, CSOs and classroom observations in the present study. The resulting Integrated TPACK–SBTSS Professional Development Framework (ITSPDF) is offered not as an abstract model but as a framework whose every stage is traceable to specific quantitative, qualitative and observational evidence gathered from Junior School Kiswahili teachers and their Curriculum Support Officers in Nyamache Sub-County.

Recommendations for Implementing the Framework

The recommendations below arise directly from the triangulated findings and are directed to the institutions and actors with responsibility for teacher professional development and Junior School curriculum implementation.

To the Teachers Service Commission and Ministry of Education

The Teachers Service Commission (TSC) and Ministry of Education should institutionalize needs-based, subject-specific continuous professional development for Junior School Kiswahili teachers, following the ITSPDF cycle. Technology should receive priority because it recorded the highest Need Index (0.527); training should move beyond basic computer operation to practical integration of digital tools in Kiswahili lessons, digital content creation, multimedia, online and offline resources, digital assessment, safe and ethical use of artificial intelligence, and selection of technology appropriate to particular Kiswahili strands and learning outcomes. TSC and the Ministry should also strengthen the enabling environment by progressively providing reliable electricity, internet connectivity, projectors/display facilities, functional computers or tablets, and access to curated Kiswahili digital resources, treating infrastructure investment as a professional-development enabler rather than a separate procurement issue. Professional development should be planned as a continuous cycle rather than isolated workshops, with annual or termly needs assessments informing training priorities, followed by classroom implementation, coaching, observation and feedback, consistent with Guskey (2002).

To KICD and KNEC

The Kenya Institute of Curriculum Development (KICD) should provide more Kiswahili-specific exemplars demonstrating how CBE learning outcomes, core competencies, values, pertinent and contemporary issues, digital literacy and assessment can be integrated into actual lessons, with particular attention to Ushairi, Fasihi, oral language, integrated language skills and culturally responsive teaching. KICD, working with KNEC and experienced Kiswahili educators, should develop and disseminate practical exemplars of competency-based and formative assessment, including rubrics, oral-performance tasks, portfolio tasks, project-based assessments and feedback strategies, responding directly to the comparatively weak observed use of formative assessment and constructive feedback.

To Curriculum Support Officers

CSOs should strengthen their role as instructional coaches, with school visits including lesson observation, demonstration teaching where appropriate, post-observation conferences, constructive feedback, support for lesson planning, and follow-up on agreed improvement targets — reinforced by the finding that 41.7% of interviewed teachers explicitly requested a shift from administrative supervision towards instructional coaching. CSOs should coordinate zonal and sub-county Kiswahili PLCs and support regular lesson study, peer observation, micro-teaching, resource sharing and action research, using experienced teachers, KNEC examiners and other subject specialists as facilitators where appropriate. Digital platforms such as moderated subject WhatsApp groups can supplement face-to-face PLC meetings, though materials shared should be professionally reviewed before classroom use.

To Head Teachers and Heads of Department

School leaders should allocate protected time for school-based professional learning and include Kiswahili professional development activities in annual school plans, facilitating peer observation, mentoring, lesson study and reflective meetings without presenting these primarily as fault-finding supervision. Where resources are limited, schools should develop transparent schedules for shared ICT equipment and prioritize maintenance so that available devices remain functional. Heads of Department should use classroom evidence to identify focused improvement goals in formative assessment, feedback, behaviour management, learner engagement, cultural integration and use of instructional resources, with follow-up documenting changes in practice and identifying areas requiring additional support.

To Teacher Training Institutions

Universities and teacher-training institutions should strengthen pre-service and in-service preparation in TPACK for language teaching, requiring teachers to design and teach technology-supported Kiswahili lessons rather than learning ICT as a stand-alone skill. Training should also include competency-based assessment, differentiated instruction, management of large classes, culturally responsive pedagogy, integrated language-skills teaching and emerging educational technologies. Partnerships between universities, TSC, KICD, schools and CSOs should be encouraged so that professional development content responds to classroom evidence and current curriculum demands, reflecting the multi-stakeholder approach unanimously endorsed by the CSOs in this study.

To Kiswahili Teachers

Teachers should actively participate in PLCs, peer observation, mentoring and lesson study, using reflective practice to identify areas for improvement, and should develop and share locally relevant instructional materials, particularly for Ushairi, oral language, Fasihi and cultural content. Teachers should progressively strengthen their ability to use digital tools for lesson preparation, learner engagement, assessment and feedback while observing professional, ethical and data-protection requirements. Because professional learning is most effective when connected to actual classroom problems, teachers should maintain simple evidence of implementation — such as revised lesson plans, samples of learner work, assessment rubrics and reflection notes — and use this evidence during coaching and PLC discussions, consistent with adult-learning principles favouring professional development that is relevant, problem-centered and immediately applicable (Knowles et al., 2020).

Suggestions for Further Research

Further studies should examine the relationship between participation in TPACK-aligned professional development and learner achievement in Kiswahili using longitudinal or quasi-experimental designs. Research could also test the proposed ITSPDF framework in other sub-counties to establish its transferability across different resource and school contexts. Additional studies are needed on the pedagogical use of artificial intelligence in Kiswahili teaching, including teacher competence, ethical practice and learner outcomes. Finally, future research could investigate the effectiveness of school-based PLCs, lesson study and instructional coaching in improving formative assessment, cultural integration and difficult content areas such as Ushairi and Sarufi.

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