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FROM SUBJECT-MATTER EXPERTISE TO PEDAGOGICAL COMPETENCE: A TYPOLOGY OF TEACHER PATHWAYS BY PREPARATION AND EXPERIENCE

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ABSTRACT

Subject-matter expertise is a prerequisite for teaching, which also draws on subject-specific pedagogical knowledge, educational psychology, and reflective practice. This article examines how professional preparation and experience interact in the development of these competencies. Drawing on a focused narrative review of teacher education research and studies conducted in Togo and francophone sub-Saharan Africa, it proposes a typology based on two dimensions: whether teachers received initial pedagogical training and their stage of professional experience. The four resulting profiles point to distinct support needs. The distinction between teachers as subject experts and teachers as pedagogical practitioners is recast in terms of observable practices, including the transformation of disciplinary knowledge into material for learning, formative assessment, and the analysis of teaching practice. The discussion considers the conditions under which supervised placements, mentoring, continuing professional development, and self-directed learning can support professional growth. The typology is a conceptual proposal that requires empirical validation.

Keywords: Teacher education, Pedagogical competence, Professional experience, Professional development, Typology

1 INTRODUCTION

A mathematics teacher may solve a proportional reasoning problem correctly yet struggle to understand why students approach it additively. To help them, the teacher must identify the reasoning behind their answers, choose a representation, and design a task that reveals whether their reasoning has changed. This example illustrates the issue addressed in this article. Subject knowledge underpins the accuracy of instruction, while subject-specific pedagogical knowledge and educational psychology inform how that knowledge is taught to a particular group of learners.

Entry into teaching and preparation for the profession are governed by institutional arrangements that vary across countries, institutions, and educational levels. In Togo, the *Précis de législation et d'administration scolaires* (Ministère de l'enseignement des premier et deuxième degrés, 1983) provides a historical point of reference for the organization of teacher education. Focusing on Togolese lower secondary schools, Tchagnaou (2008) and Tchagnaou and Baoutou

(2017) examined the relationship between initial teacher education, classroom practice, and learning. At the primary level, the PASEC2019 report provides a regional basis for examining student achievement, teacher knowledge, and teaching conditions in Niger, Togo, and other francophone countries (Programme d'analyse des systèmes éducatifs de la CONFEMEN, 2020). These sources cover different populations, periods, and educational levels, and their contributions should be interpreted in light of those differences.

The research question is as follows. How can pedagogical training and professional experience be combined in a typology that captures the diversity of teacher pathways and helps identify support needs? The article has three objectives. It clarifies the components of teaching competence, develops a typology based on preparation and experience, and identifies implications for initial teacher education, induction, and continuing professional development.

Part of the difficulty arises from conflating qualification, experience, and competence. Qualifications indicate a credential or recognized preparation. Experience encompasses the situations teachers have encountered and the responsibilities they have assumed. Competence is apparent in the decisions teachers make to promote learning in a given situation. For example, two teachers with the same qualification may differ in their ability to interpret an unexpected response. Teachers with similar lengths of service may have had very different opportunities to observe colleagues, receive feedback, or revise a teaching unit. Comparing their pathways is meaningful when it allows these differences to be discussed and documented.

The article first presents the approach and the components of teaching competence. It then specifies the criteria for constructing the four profiles and relates them to observable practices. The discussion examines the conditions for supporting teachers and proposes a research design for testing the typology.

2 APPROACH AND SCOPE OF THE ANALYSIS

This conceptual article draws on a focused narrative review. Research on teacher knowledge informs the dimensions of competence. The literature on school and teacher effects clarifies the limits of attributing student outcomes to a single factor. Togolese studies and the PASEC2019 report situate the question in francophone African contexts. Research on induction and professional development informs the proposed forms of support.

The analysis proceeds in three stages. It distinguishes what teachers gain from training, what they can learn through practice, and how competence can be observed. It then cross-classifies initial preparation and career stage. Finally, it identifies potential needs and plausible forms of support for each profile. These needs are working hypotheses. The analysis draws on published sources and the author's earlier work. Its narrative selection of sources limits its scope, and the design provides neither estimates of how common the profiles are nor comparative measures of their effectiveness.

Each group of sources serves a specific purpose. Shulman (1986) provides the categories for distinguishing subject-matter expertise from pedagogical content knowledge. Bressoux (1994) informs the interpretation of student outcomes. Research on mentoring and professional development helps identify forms of support whose effects could be studied (Desimone, 2009; Ingersoll & Strong, 2011). Togolese and regional sources help delimit the contexts to which the analysis applies. The classroom scenarios are constructed illustrations.

3 COMPONENTS OF TEACHING COMPETENCE

3.1 Subject-Matter Expertise and the Transformation of Disciplinary Knowledge for Teaching

Academic preparation develops knowledge of the concepts, forms of reasoning, and standards of validity specific to a discipline. In teaching, this expertise is reflected in the selection of sound examples, the ordering of concepts by importance, and the ability to answer questions accurately. In Shulman's (1986) terms, pedagogical content knowledge includes an understanding of the representations, examples, and difficulties that affect learners' access to particular subject matter. Explaining a grammatical rule, helping students identify when it applies in a text, and guiding them to use it in their own writing therefore require different professional skills.

These demands give subject-specific pedagogy a central place in teacher education. Analyzing student work, comparing tasks, and anticipating errors give prospective teachers opportunities to exercise pedagogical judgment. For example, a teacher educator might ask trainees to design two problems addressing the same concept and justify which one would better reveal a particular difficulty.

Transforming content for teaching also involves identifying what must remain invariant across representations. In a lesson on proportionality, a table of values, a graph, and a unit-rate calculation can illuminate the same relationship. The suitability of each representation depends on the difficulty encountered. If a student consistently adds the same amount to both quantities, a counterexample in which the increments differ can prompt discussion of that procedure. Competence is observable in the connection between the error identified, the example chosen, and the method used to check whether the student's reasoning has changed.

The same applies to the sequencing of tasks. An activity that calls for immediate reproduction of a procedure can reveal whether students have begun to master it. A task set in a different context can then show whether they recognize when the procedure applies. A lesson plan shows an observer the intended progression. Students' classroom responses and an interview with the teacher can show how it was adjusted.

3.2 Educational Psychology and Assessment

Educational psychology informs how teachers take account of learners' prior knowledge, development, motivation, and diversity. It guides the wording of instructions, the choice of participation formats, and the organization of individual and group work. Applying this knowledge requires attention to learners' responses. An instruction that is repeatedly misunderstood may indicate a language barrier, an unstated assumption specific to the discipline, or a mismatch between the task and prior learning.

Assessment provides evidence for deciding what to teach next. It becomes formative when teachers gather evidence of understanding, interpret difficulties, and use the information to adjust tasks, while learners receive feedback they can act on. A whole-class review can lead to reteaching a procedure to a small group, introducing a new example, or asking students to revise their work using explicit criteria. Professional judgment takes account of what students' responses show and how their work changes across activities.

In classrooms where students have varying proficiency in the language of instruction, difficulty may arise from reading the instructions, understanding the concept, or both. Rephrasing the instructions orally, providing a visual representation, and asking students to justify their answers offer complementary evidence. A student, for example, might successfully order fractions shown visually but hesitate when the same question is presented only in writing. This gives the teacher a reason to revisit the vocabulary used to compare fractions and then set a comparable task. Observation can focus on the appropriateness of the diagnosis and how well the follow-up addresses it.

The organization of participation also shapes diagnosis. A discussion in which only a few students speak gives a partial picture of class understanding. A short written response followed by comparison in pairs can reveal reasoning missed during oral review. The teacher can then select two representative responses and ask the class to explain how they differ. This arrangement connects participation to a specific learning objective.

3.3 Reflective Practice and Professional Ethics

Self-assessment involves examining evidence from one's practice and comparing intentions with observable outcomes. A teaching unit, annotated student work, and a discussion with a colleague can help identify explanations, tasks, or criteria that warrant revision. Self-directed professional learning extends this process when teachers seek out resources, assess them against the literature and curriculum, and try them in their own settings. It can draw on peer networks, digital resources, and professional reading.

Professional ethics applies to all teachers regardless of their preparation. It encompasses respect for learners' dignity and confidentiality, fairness in assessment, and appropriate boundaries in relationships with learners. Institutions are responsible for making rules explicit and establishing procedures for reporting and addressing misconduct. When examining teaching practice, relevant indicators concern professional conduct, such as the consistent application of assessment criteria or the teacher's response to an error made in front of others.

Reflection can focus on a decision whose effects can be examined. After noticing that several groups struggle to begin an activity, a teacher can compare the instructions actually given with the lesson plan. The teacher can then rephrase the task, make a success criterion explicit, and examine students' initial work in the next lesson. A colleague's feedback may help distinguish between possible explanations, such as an unstated expectation or insufficient prior knowledge. During professional development discussions, student work is anonymized and observations are interpreted in relation to the situation under study.

4 A TYPOLOGY BASED ON PREPARATION AND EXPERIENCE

4.1 Definition of the Two Dimensions

The first dimension distinguishes teachers who received structured initial pedagogical training from those who entered the profession without it. Such training can combine subject-specific pedagogy, educational psychology, and supervised practice. Empirical studies using this dimension should document the content, duration, and format of training. Academic degrees and professional qualifications can thus be recorded separately. In-service training and formal recognition of prior learning provide additional information about the pathway.

The second dimension distinguishes the induction stage from the period of established teaching experience. Length of service provides a reference point to be specified in relation to the educational level and setting. The responsibilities assigned, the range of situations encountered, and access to feedback help explain what teachers may have learned through experience. Empirical research should establish classification criteria before data collection and measure professional practices separately.

Timing matters for classification. A person recruited before completing structured pedagogical preparation enters teaching without initial pedagogical training. If the teacher subsequently gains a qualification, the record should specify the date, content, and format of that training. This preserves information on entry conditions while accounting for later professional development.

Career stage and familiarity with a particular post can also diverge. An experienced primary teacher moving to another educational level retains professional experience while facing the demands of a new role. Researchers should therefore record total length of service, time spent teaching at the level observed, and changes in assignment separately. Table 1 summarizes the combinations of pathways and the support questions to explore.

Table 1: Teacher Pathway Profiles and Potential Support Needs

Initial preparation	Career stage	Question to investigate	Potential support
With initial pedagogical training	Early career	Application of learning from supervised placements when assuming responsibility for a class	Mentoring, joint unit planning, and feedback after observation
With initial pedagogical training	Established experience	Adaptation of practice to changes in learners, curricula, and teaching constraints	Peer observation, targeted training, and follow-up on classroom adjustments
Without initial pedagogical training	Early career	Immediate needs in lesson planning, classroom management, and assessment	Induction, subject-specific pedagogy workshops, observation, and close mentoring
Without initial pedagogical training	Established experience	Identification of competencies acquired in practice and of specific support needs	Assessment in context, modular training, and recognition of prior learning under the applicable framework

Source: Typology developed by the author.

4.2 The Four Teacher Profiles

4.2.1 Early Career With Initial Pedagogical Training

For beginning teachers with pedagogical training, the main challenge is adapting to the daily responsibility of running a classroom. A teacher may know how to plan a unit during training and still need help adjusting its pace when learners differ in their understanding. Observations at several points in the school year can reveal which adjustments the teacher gradually learns to make independently.

Mentoring for this profile can begin with a specific discrepancy between planning and implementation. For example, a beginning teacher plans twenty minutes of group work and finds that some students spend most of that time trying to understand the task. The mentor and teacher examine the instructions and initial student work, then agree on an adjustment for a subsequent lesson. A follow-up observation can show whether students start the activity sooner and whether the teacher can apply the same principle in another unit.

4.2.2 Established Experience With Initial Pedagogical Training

Experienced teachers with professional preparation can connect what they learned during training with knowledge acquired in practice. Changes in curriculum, student population, or teaching subject may create new needs. Sharing practices and mentoring provide opportunities to articulate strategies developed over time, including for the colleague who serves as mentor.

Support for this profile may take the form of collaborative inquiry into a shared problem. Teachers implementing a new curriculum can compare assessment tasks and the responses they elicit, then discuss design choices that make curricular expectations clearer. Experience thus becomes a resource for collective work. Supporting a beginning teacher also requires the ability to explain one's decisions, listen to the colleague's concerns, and provide actionable feedback.

4.2.3 Early Career Without Initial Pedagogical Training

For beginning teachers recruited without initial pedagogical training, structured induction can address immediate professional tasks. Planning, clarifying expectations, diagnosing difficulties, and managing interactions can be examined through actual lessons. Regular meetings with a mentor can connect this preparation to the questions that arise during the first weeks of teaching.

For this profile, induction can be organized around the first unit the teacher delivers. A workshop helps the teacher select the objective, formulate instructions, and plan a task to check learning. The mentor then observes an agreed segment of the lesson and helps identify a priority adjustment. Principles from educational psychology and subject-specific pedagogy are thereby grounded in difficulties the teacher encounters early in practice.

4.2.4 Established Experience Without Initial Pedagogical Training

Experienced teachers recruited without initial pedagogical training may have built a repertoire of practices through work with colleagues, continuing professional development, or self-directed learning. Observation of a teaching unit and analysis of student work can help assess established routines and identify where further support would be useful. Where formal recognition of prior learning is available, it can account for competencies developed on the job.

An interview and a teaching portfolio may reveal competencies that are scarcely visible in administrative records. For example, a teacher may have developed a sequence of reading activities through exchanges with peers and may be able to explain adaptations for struggling students. The sequence, several samples of student work, and lesson observations give a basis for discussing existing competencies and further needs. Modular training can then target an area such as the development of shared assessment criteria.

4.3 Relating Subject Expertise and Pedagogy to Observable Practice

The expressions "teacher as subject expert" and "teacher as pedagogical practitioner" refer to two dimensions that can coexist in the same professional. The first emphasizes mastery of content and the second emphasizes the ability to create conditions for learners to understand and use it. How the two are combined can vary with the topic taught, available resources, and learners' level. The pathway typology describes the conditions under which teachers develop professionally. An observation framework can help examine what teachers draw on in particular situations.

Using the framework formatively involves comparing several kinds of evidence. Written instructions reveal the stated expectations. Observation shows how those expectations are understood and clarified. Interviews elicit the reasons for an adjustment and allow other options to be discussed. Table 2 sets out the dimensions to examine. For each indicator, observers should be able to record when there was no opportunity to observe it, for example when a lesson did not include any review of student work.

Table 2 allows examination of dimensions that may develop differently within the same instructional situation. A lesson can present accurate concepts while leaving a difficulty unresolved. Joint examination of the teaching materials, instructions, and student work can help establish whether the problem lies in the wording of the task, the representation chosen, or a recurring error that was insufficiently addressed. Classroom interactions show how students are supported, while annotated work and follow-up activities show how assessment informs remedial instruction.

Analysis of teaching practice can be documented by comparing the explanation given in an interview with adjustments visible across lessons. Assessing equity requires repeated observations, for example of opportunities to speak, the distribution of assistance, and the application of assessment criteria. For each dimension, observers should distinguish a lack of opportunity from an observed difficulty. Applied across the four profiles in Table 1, the framework supports diagnosis and helps track changes. Comparative use would require explicit rating criteria and checks on consistency across observers.

Table 2: Dimensions and Observable Indicators of Teaching Competence

Dimension	Indicators to examine	Sources of evidence
Subject-matter expertise	Accuracy of concepts, relevance of examples, and justification of procedures	Teaching materials, explanations, and classroom exchanges
Transformation of content for teaching	Sequencing of tasks, anticipation of errors, and choice of representations	Lesson plans, instructions, and learner work
Facilitation of learning	Distribution of speaking opportunities, clarification of expectations, and adaptation of support	Lesson observations and records of classroom interaction
Assessment and remediation	Explicit criteria, actionable feedback, and targeted follow-up on difficulties	Annotated work, rubrics, and follow-up activities
Analysis of teaching practice	Identification of a difficulty and justification of an adjustment	Interviews, teaching logs, or successive versions of a unit
Professional ethics	Equitable treatment of learners and respect for their dignity	Repeated observations, assessment documents, and institutional procedures

Source: Observation framework proposed by the author.

5 DISCUSSION

5.1 Relating Teacher Pathways to Learning Across Levels of Analysis

Tchagnaou and Baoutou (2017) used several instruments to examine teacher preparation and practice in two public secondary schools in Togo. The study addresses a context-specific problem and illustrates how complementary sources can document classroom practice. PASEC2019, in turn, examines student achievement and primary teacher characteristics across 14 countries (Programme d'analyse des systèmes éducatifs de la CONFEMEN, 2020). Together, these sources point to the need to measure preparation, professional knowledge, classroom practice, and student achievement separately. Differences in populations and methods limit direct comparison.

Research on school and teacher effects shows that context and measurement choices matter when explaining differences in achievement (Bressoux, 1994). Class size, access to teaching materials, and prior achievement, for instance, can influence both the practices teachers can use and the outcomes observed. A mean end-of-term grade provides information about assessed work in a particular class. Studying how practice contributes to learning gains also requires evidence about starting points, task comparability, and the conditions under which tasks were completed. The typology helps organize descriptions of teacher pathways within such a study.

The relationship between teacher pathways and learning can be studied as a series of links. Initial preparation and opportunities for learning on the job help explain the knowledge available to teachers. That knowledge and their working conditions shape classroom practice. In turn, these practices influence students' opportunities to participate, practice, and receive feedback. Each link requires distinct evidence. An association between qualifications and mean scores leaves open questions about the practices used and the conditions under which teachers implemented them.

Teacher assignment rules warrant particular attention in comparative research. If teachers with one profile work mainly in schools whose resources and student populations differ from those of other schools, observed differences may reflect several factors acting together. Comparing similar schools, examining prior achievement, and documenting working conditions would reduce some of this ambiguity. When some profiles are uncommon in a setting, comparative case studies could be reported with an explicitly delimited scope.

5.2 Professional Development Across the Teaching Career

Initial teacher education provides a setting for studying content, preparing to teach it, and learning to observe students. Combining theoretical study with supervised placements allows focused feedback on specific decisions. In their review of induction, Ingersoll and Strong (2011) reported generally favorable results for induction and mentoring, with variation across programs and outcome measures. Programme design should therefore specify the frequency of meetings, mentor preparation, and the kinds of observation planned.

Continuing professional development also requires a link between activities and the changes they are intended to produce. Desimone's (2009) framework identifies content focus, active learning, coherence, duration, and collective participation as features to examine. In a program focused on formative assessment, for example, teachers could bring samples of student work, develop feedback together, and then examine learners' revisions. This process generates evidence for assessing how teachers apply what they have learned. Extending this line of research, Sims et al. (2025) synthesized 104 randomized trials of professional development. Programs that combined mechanisms for building insights, motivating change, developing techniques, and embedding them in practice had larger effects on student test scores on average, although the difference did not reach conventional levels of statistical significance.

Programme coherence can be examined at three stages. The initial assessment identifies a specific difficulty, such as the limited use of students' errors during review. Teachers then try strategies that address it during training. At follow-up, they bring successive samples of work, instructions, or observation notes to discuss their adjustments. This continuity helps distinguish attendance, uptake of an approach, and its implementation in the classroom.

Mentoring requires clearly defined working arrangements. A school can schedule a common meeting time and focus observation on a mutually agreed aspect of practice. The mentor then helps identify an action that can be taken before the next meeting. When the same person is also responsible for administrative appraisal, the purposes for which the evidence is used, who may access it, and how feedback will be provided should be made explicit. These conditions affect whether classroom difficulties can be discussed openly.

5.3 Adapting Support to Educational Levels

At preschool and primary levels, placements can focus on observing child development, establishing classroom routines, and teaching early reading or mathematical reasoning. At secondary level, support may focus on subject-specific difficulties, the assessment of reasoning, and the organization of group work. At university, needs include course design, the alignment of assessment with learning objectives, and supervision of student work. Each example translates the need for pedagogical preparation into priorities appropriate to the level.

Schools and teacher education providers can use the typology to structure an initial interview, identify priorities, and set follow-up objectives. Diverse pathways call for flexible provision. Peer observation requires scheduling, shared criteria, and time for discussing lessons. Teachers working in under-resourced schools also need feasible ways to participate, such as local meetings or activities that can be carried out with available materials.

At preschool level, observers can examine how a play activity prompts several children to participate and express their thinking. At primary level, they can follow the progression from recognizing words to understanding a short text. At secondary level, the priority may be helping learners distinguish a scientific justification from an answer based on a single observation. In higher education, assignment prompts and marking criteria can be examined for alignment between learning objectives and expected work. In each case, diagnosis links the situation, the content taught, and the available evidence.

In the settings discussed in Niger and Togo, comparisons would benefit from documenting local recruitment arrangements, placement opportunities, and the resources available to teaching teams. Professional development that depends on a stable internet connection or an external mentor's regular availability requires conditions that should be verified at each institution. The typology can help identify needs, while local diagnosis guides how support is delivered.

5.4 Limitations and Empirical Testing

The categories simplify pathways that may be discontinuous. Initial preparation can include little teaching practice, while a teacher recruited directly may receive intensive in-service support. Empirical descriptions should distinguish training hours, supervised practice, mentoring, actual length of service, and career interruptions. The Togolese evidence and PASEC data cover different levels and settings, limiting the reach of the propositions concerning higher education.

The typology could be tested in a multisite study that includes all four profiles at the same educational level. Training records and interviews would describe teacher pathways. Repeated observations using a common framework, with ratings discussed among observers, would document practice. If student achievement is examined, measures at the beginning and end of the study period, together with classroom contextual information, would help interpret differences. Longitudinal follow-up would illuminate changes in practice and their relationship to the support teachers receive.

An initial study phase could take place in lower secondary schools in the same area, at a specified grade level and in a single subject. Recruitment would aim to cover all four profiles across different schools. A teacher pathway record would document degrees, training dates, supervised placements, responsibilities, and continuing professional

development. A follow-up interview would clarify mixed pathways. Classification stability could be examined by applying several length-of-service thresholds justified by local induction arrangements.

A second phase would collect lesson plans, task instructions, anonymized student work, and observations at several points in time. Two researchers would code a subset of lessons, discuss discrepancies in their interpretations, and refine the indicators. Post-lesson interviews would document the reasons teachers give for their decisions. Participation would be voluntary, the aims of the study would be explained, and individual data would be stored in a manner consistent with confidentiality requirements.

Analysis could begin by comparing cases within profiles and then identify patterns of similarity and difference across profiles. A first question would be whether teachers who completed supervised placements more frequently anticipate errors specific to the content being taught. A second would examine the relationship between access to mentoring and teachers' ability to adjust a unit between two observations. A third would examine whether practices teachers reflect on collectively can be observed in classrooms in different settings. The findings could refine the categories, particularly when in-service preparation plays a decisive role in a teacher's pathway.

6 CONCLUSION

Teaching competence develops through the interaction of subject-matter expertise, the ability to organize learning, and professional judgment in context. Considering initial pedagogical training alongside the stage of professional experience identifies four pathways and potential support needs to investigate. Studying practice requires distinct observations of planning, classroom interaction, assessment, remediation, and reflection on teaching.

Preparation for teaching can be strengthened through supervised placements, induction supported by mentoring, and continuing professional development tied to classroom difficulties. Self-directed learning and collaboration with peers extend these opportunities when teachers have the time and resources to examine their practice. The typology can guide support according to teachers' pathways. Its use across educational levels calls for studies that document these pathways and observe how they evolve.

Validation will need to establish when the categories help identify professional needs and when more information is required. Comparing teacher pathways and observing practice repeatedly will show how the typology can inform the design of placements, early career support, and in-service training.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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