



Teachers' Beliefs, Perceived Knowledge, and Self-Reported Practices Regarding Formative Continuous Assessment

A Correlational Study from Gondar, Ethiopia

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ABSTRACT

This study investigated the interrelationships among teachers' beliefs, perceived knowledge, and self-reported practices concerning formative continuous assessment (FCA) in Gondar City, Ethiopia. Employing a quantitative correlational design, data were collected from 182 grade 5–8 teachers across four subject areas (Amharic, English, Mathematics, and Biology) through a structured, expert-validated questionnaire using a four-point Likert scale (response rate = 91.0%). Pearson product-moment correlation analyses, supported by bias-corrected accelerated (BCa) bootstrapping with 2,000 resamples, revealed statistically significant positive associations among all three constructs. The most robust relationship emerged between perceived knowledge and practice ($r = .608, p < .01$), followed by the belief–knowledge link ($r = .568, p < .01$), and a moderate yet substantively meaningful belief–practice association ($r = .461, p < .01$). Subsequent multiple regression analysis identified perceived knowledge as the primary predictor of FCA practice ($\beta = .512, p < .001$), with the overall model accounting for approximately 38.9% of the variance in practice (adjusted $R^2 = .383$). Teacher beliefs also contributed a statistically significant, albeit smaller, independent effect ($\beta = .170, p = .018$). These findings indicate that teachers' self-assessed FCA knowledge functions as the principal driver of classroom implementation within Ethiopia's newly adopted curriculum, underscoring an urgent need for targeted, practice-embedded professional development designed to strengthen formative assessment literacy.

Keywords

Correlational Study
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Introduction

Contemporary educational scholarship has witnessed a fundamental reorientation in the conceptualization and measurement of student learning. The long-standing primacy of summative, end-of-term examinations as the exclusive arbiter of academic achievement has been progressively challenged by a more dynamic, instructionally responsive alternative. Formative continuous assessment (FCA) occupies a central position within this transformation. In contrast to summative instruments that render a retrospective verdict on learning outcomes, FCA is conceived as an integral component of the everyday instructional cycle enabling educators to gather real-time evidence of student understanding, furnish constructive feedback, and calibrate subsequent instruction accordingly [1], [2]. Clark [3] characterizes this paradigmatic transition as extending far beyond technical recalibration, positing instead that it represents a wholesale reconceptualization of the constitutive relationships among teaching, learning, and evaluation. When enacted with genuine pedagogical fidelity, FCA has been empirically associated with enhanced student engagement, elevated achievement outcomes, and the cultivation of cognitively demanding classroom cultures [4], [5].

The degree to which FCA achieves its intended effects in any given classroom ultimately hinges on the teachers entrusted with its enactment. Three interconnected dimensions of teacher capacity appear particularly consequential in this regard: the beliefs teachers hold concerning the purpose and value of assessment, the degree of FCA competence they attribute to themselves, and the manner in which these beliefs and knowledge claims manifest in day-to-day instructional behavior. Extant research has consistently demonstrated that teachers who hold robust, affirmative beliefs about formative assessment tend to implement it with greater depth and deliberateness [6]-[8]. Comparably, teachers who perceive themselves as competent in formative strategies are more inclined to translate that perceived competence into meaningful classroom action [9], [10]. Ethiopia's national commitment to formative assessment was formalized as early as 2013 with the introduction of the Assessment for learning program, developed in collaboration with Education Above All [11]. This trajectory was further consolidated through the national Education Development Roadmap [12] and the recently implemented 2024 national curriculum, which explicitly prioritizes continuous assessment over high-stakes terminal examinations.

For practitioners operating in Ethiopian classrooms, however, this policy mandate arrives against a formidable contextual backdrop. Prior investigations have consistently documented impediments including excessive class sizes, insufficient instructional resources, inadequate practical professional development, and assessment training that bears limited correspondence to classroom realities [13]-[17]. Research by Oli and Olkaba [18] and Olkaba and Bongase [19] further indicates that continuous assessment in Ethiopian teacher education colleges remains inconsistently operationalized, with graduates frequently ill-equipped to translate policy into practice. Some teachers have come to regard continuous assessment as an administrative compliance obligation rather than a substantive pedagogical instrument [20], [21]. Despite these well-documented challenges, the question of how beliefs, knowledge, and practice interrelate within Ethiopia's current curriculum reform context and which construct most powerfully predicts actual classroom behavior has received limited empirical attention. This gap carries direct practical significance: absent clarity regarding whether beliefs or knowledge more proximally shapes what teachers do, professional development initiatives risk misallocating resources toward the less influential variable. Leung [22] argued persuasively that strengthening formative assessment practice requires fundamentally transforming the relationship between knowledge and practice rather than merely augmenting either in isolation.

The literature has also documented a persistent disjuncture between what teachers profess to believe and what they actually enact [23]. Dixon [24] reported that even teachers who articulated theoretically sophisticated understandings of formative feedback frequently struggled to realize those understandings in consistent classroom behavior. Jett [25] observed analogous patterns among elementary science teachers, attributing the dissonance between espoused values and enacted practice to competing institutional demands and insufficient procedural knowledge. Whether equivalent dissonances characterize Ethiopian teachers implementing FCA under the new curriculum has yet to be systematically examined. The present study directly addresses these lacunae through a rigorous correlational investigation of grade 5–8 teachers in Gondar City, examining both the direction and magnitude of associations among beliefs, perceived knowledge, and reported practice, and identifying which construct most powerfully predicts FCA implementation. The findings are intended to advance beyond descriptive accounts and toward actionable insight—furnishing teacher educators, curriculum developers, and school leaders with empirically grounded guidance for designing professional support structures that enable teachers to bridge national policy and daily classroom practice.

The study pursued two primary objectives:

1. To examine the interrelationships among teachers' beliefs, perceived knowledge, and self-reported practices concerning FCA within the context of Ethiopia's newly implemented national curriculum.
2. To determine the relative predictive contributions of teachers' beliefs and perceived knowledge to their self-reported FCA practice.

Material and Methods

A. Study Setting and Design

This investigation was conducted in Gondar City, an urban administrative and educational center located in the Amhara Region of Ethiopia, which constitutes a representative and logistically accessible site for examining curriculum implementation dynamics within primary education. A quantitative correlational research design was employed, selected for its appropriateness in examining the strength, direction, and significance of associations among multiple continuous variables without recourse to experimental manipulation [26]. Four subject areas were purposively incorporated Amharic, English, Mathematics, and Biology to capture cross-disciplinary variation in assessment beliefs and practices among grade 5–8 teachers, thereby enhancing the breadth and ecological validity of the findings.

B. Participants and Sampling

The target population comprised all teachers responsible for instruction in the four designated subject areas within Gondar City's grade 5–8 government primary schools. Stratified random sampling was employed to ensure proportional representation across subject disciplines and gender. The total sampling frame consisted of 468 teachers, from whom a sample of 200 was drawn. Stratification was first applied by subject area and subsequently by gender, with individual participants selected through simple random sampling within each stratum. An eligibility criterion requiring a minimum of one year of teaching experience in the relevant subject was applied to ensure that respondents possessed adequate experiential grounding to provide meaningful reports of assessment practices.

Of the 200 sampled teachers, 182 returned complete and usable questionnaires, yielding an overall response rate of 91.0% a figure that meets or surpasses established benchmarks for survey-based educational research [27], [28]. Response rates by gender were 98.7% for male teachers (78 of 79) and 85.9% for female teachers (104 of 121). Table 1 presents the comprehensive distribution of the sampling frame, selected sample, and respondents by subject area and gender.

C. Instruments

Data were gathered using a structured questionnaire comprising three validated subscales, each employing a four-point Likert-type scale (1 = Strongly Disagree; 4 = Strongly Agree). The

instrument was adapted from established FCA measures and subjected to systematic validation procedures prior to data collection.

Table 1. Sample Frame, Selected Sample, and Response Rate Distribution by Subject Area and Gender

Subject	Sample Frame			Selected Sample			Respondents	
	M	F	T	M	F	T	M/F	T
Amharic	42	76	118	18	32	50	18/29	47
English	52	25	77	22	11	33	21/10	31
Mathematics	48	64	112	21	27	48	21/21	42
Biology	42	119	161	18	51	69	18/44	62
Total	184	284	468	79	121	200	78/104	182
Percentage	39.3%	60.7%		39.5%	60.5%		98.7% / 85.9%	91.0%

Note. M = Male; F = Female; T = Total. Response rate percentages in the bottom row represent gender-disaggregated rates (98.7% male; 85.9% female) and overall rate (91.0%), respectively.

The FCA Beliefs subscale (10 items), adapted from Chala et al. [29] and Hanefar et al. [30], and was designed to capture teachers' evaluative orientations toward the purpose and educational value of formative assessment. Content validity was established through independent review by three subject-matter experts, yielding a content validity index (CVI) of .99 comfortably exceeding the recommended threshold of .90 [31], [32]. Item-total correlations ranged from .630 to .759 (all $p < .001$), and internal consistency was strong (Cronbach's $\alpha = .816$).

The Perceived FCA Knowledge subscale (26 items), adapted from Alufohai and Akinlosotu [33] and Nora et al. [34], assessed teachers' self-reported understanding of FCA principles, techniques, and procedural applications. Expert-reviewed content validity again yielded a CVI of .99. Item-total correlations ranged from .511 to .762 (all $p < .001$), and Cronbach's $\alpha = .935$ indicated excellent internal consistency.

The FCA Practice subscale (22 items), adapted from Sintayehu [35] and McMillan and Schumacher [36], assessed the self-reported frequency and quality of formative assessment behaviors enacted in the classroom. Content validity reached a CVI of .99, item-total correlations ranged from .504 to .628 (all $p < .001$), and Cronbach's $\alpha = .798$, exceeding the conventional threshold of .70 [37].

D. Data Analysis

Descriptive statistics specifically means and standard deviations were computed for all three constructs. Pearson's product-moment correlation coefficient was subsequently employed to assess bivariate associations, followed by standard multiple regression analysis to determine the independent predictive contributions of beliefs and perceived knowledge to reported practice. To enhance the robustness of parametric estimates and relax strict distributional assumptions, a bootstrapping procedure employing 2,000 resamples with bias-corrected accelerated (BCa) 95% confidence intervals was applied throughout [38], [39].

Distributional assumptions were evaluated using bootstrapped skewness and kurtosis statistics. Beliefs exhibited skewness of -1.174 (BCa 95% CI $[-1.593, -0.613]$) and kurtosis of 1.925 (BCa 95% CI $[0.653, 3.031]$). Perceived knowledge showed skewness of -1.224 (BCa 95% CI $[-1.635, -0.545]$) and kurtosis of 2.487 (BCa 95% CI $[1.179, 3.438]$). Practice demonstrated skewness of -0.908 (BCa 95% CI $[-1.688, -0.035]$) and kurtosis of 3.456 (BCa 95% CI $[-0.056, 6.229]$). All values fell within conventionally accepted boundaries for approximate normality ($|\text{skewness}| < 2$; $\text{kurtosis} < 7$), thereby supporting the use of parametric statistical procedures [39]. Multicollinearity was evaluated using the variance inflation factor ($\text{VIF} = 1.48$), indicating the absence of problematic collinearity between beliefs and perceived knowledge as predictors.

Results

A. Descriptive Statistics and Bivariate Correlations

Table 2 reports the means, standard deviations, and Pearson inter correlations among the three study constructs. Participants reported moderately high mean scores on both FCA beliefs ($M = 3.23$, $SD = 0.499$) and perceived FCA knowledge ($M = 3.28$, $SD = 0.492$), whereas reported practice scores were comparatively lower ($M = 2.78$, $SD = 0.481$). This pattern indicates that teachers' evaluative convictions and self-assessed competence regarding FCA tend to exceed the frequency and quality of their actual classroom implementation.

Table 2. Means, Standard Deviations, and Pearson Correlations among FCA Beliefs, Perceived Knowledge, and Practice ($N = 182$)

No.	Variable	M	SD	1	2	3
1	FCA Beliefs	3.23	.499	—		
2	FCA Perceived Knowledge	3.28	.492	.568**	—	
3	FCA Practice	2.78	.481	.461**	.608**	—

Note. FCA = Formative Continuous Assessment. $P < .01$ (two-tailed). Bootstrap confidence intervals based on 2,000 resamples with BCa correction. Effect size benchmarks following Gignac and Szodorai [40]: small = .10–.29; medium = .30–.49; large $\geq .50$.

The correlation matrix revealed a coherent network of statistically significant positive associations. The most robust relationship was observed between perceived knowledge and practice ($r = .608$, $p < .01$), constituting a large effect and indicating that higher self-reported FCA competence is closely coupled with more frequent and confident classroom implementation. A comparably strong correlation emerged between beliefs and perceived knowledge ($r = .568$, $p < .01$), suggesting that teachers who attribute greater educational value to FCA also tend to report higher levels of conceptual and procedural understanding. The belief–practice relationship was moderate but substantively meaningful ($r = .461$, $p < .01$), confirming that teachers' evaluative orientations toward formative assessment align appreciably with their self-reported classroom behaviors. All bootstrapped confidence intervals corroborated the stability of these estimates.

B. Multiple Regression Analysis

To assess the relative predictive value of beliefs and perceived knowledge on FCA practice, a standard multiple regression model was specified with practice as the criterion variable. Table 3 presents the unstandardized (B) and standardized (β) regression coefficients, standard errors, t-values, p-values, and bootstrapped 95% BCa confidence intervals.

Table 3. Multiple Regression Coefficients for Predictors of FCA Practice (N = 182)

Predictor	B	SE	β	t	p	95% BCa CI for B
Intercept	0.614	0.210	—	2.915	.004	[0.198, 1.029]
FCA Beliefs	0.163	0.068	.170	2.390	.018	[0.028, 0.298]
FCA Perceived Knowledge	0.501	0.069	.512	7.208	< .001	[0.364, 0.638]

Note. B = unstandardized regression coefficient; SE = standard error; β = standardized coefficient; CI = confidence interval. $R = .624$; $R^2 = .389$; Adjusted $R^2 = .383$; $F(2, 179) = 57.071$, $p < .001$. Tolerance $> .60$; VIF = 1.48 (multicollinearity absent). Bootstrap CIs based on 2,000 resamples with BCa correction.

The overall regression model was statistically significant, $F(2, 179) = 57.071$, $p < .001$, accounting for 38.9% of variance in FCA practice ($R^2 = .389$; adjusted $R^2 = .383$). Perceived knowledge emerged as the dominant predictor ($\beta = .512$, $p < .001$), indicating that each standardized unit increment in self-assessed FCA competence corresponded to a substantial increase in reported practice. Beliefs also contributed a statistically significant, albeit comparably smaller, independent effect ($\beta = .170$, $p = .018$). The absence of multicollinearity (VIF = 1.48; Tolerance $> .60$) confirms that each predictor contributed distinctively and independently to the explained variance in practice.

Discussion

The findings of this study present a theoretically coherent and empirically well-grounded account of how beliefs, perceived knowledge, and FCA practice relate to one another within the Ethiopian context. Taken collectively, the correlational and regression results converge on a central conclusion: perceived knowledge constitutes the most powerful direct correlate and predictor of FCA practice, functioning as the indispensable mechanism through which a teacher's philosophical endorsement of formative assessment finds concrete expression in classroom behavior.

The large correlation between perceived knowledge and practice ($r = .608$) both replicates and extends prior scholarship. Herman et al. [10] argued that teacher knowledge does not merely precede assessment practice but actively determines the quality and sophistication of the instructional strategies educators select. Within the Ethiopian context specifically, Yigzaw and Bishaw [17] identified knowledge of continuous assessment as a meaningful predictor of practice a finding the present study replicates with a larger, more demographically diverse sample. Comparable patterns have been documented in analogous educational systems: Alufohai and Akinlosotu [33] demonstrated among Nigerian secondary teachers that knowledge levels directly influenced both attitudes toward and enactment of

continuous assessment, while Amoako et al. [41] showed among Ghanaian mathematics teachers that stronger formative assessment knowledge was significantly associated with broader utilization of diversified assessment strategies. The systematic review by Yan et al. [8] identified teacher competence and domain knowledge as among the most consistently influential determinants of formative assessment implementation globally. More recently, Karakaya and Yılmaz [6] demonstrated that Turkish primary teachers' self-efficacy a construct closely intertwined with perceived knowledge mediated the relationship between attitudes and formative assessment practices, a finding whose underlying structure resonates strongly with the predictive hierarchy observed in the present study.

The strong belief knowledge correlation ($r = .568$) merits equal attention. It aligns with Yan and Cheng's [7] theoretical framework, which established that positive attitudes toward formative assessment are significantly associated with teachers' perceived competence and readiness to engage with formative strategies. Teachers who genuinely value FCA appear more intrinsically motivated to acquire the knowledge structures required to enact it effectively. Al Rashidi and Al-Ahmad [9] reported analogous patterns among Kuwaiti science teachers, noting that FCA knowledge and beliefs were substantially correlated and jointly influenced implementation quality. The belief knowledge relationship observed here is further consistent with Bell and Cowie's [42] characterization of formative assessment as inherently interactional and context-sensitive: teachers' formative decisions are shaped simultaneously by what they know and by what they believe about learning and students. The strong intercorrelation between these constructs suggests that the Ethiopian teachers in this sample have developed relatively coherent internal frameworks linking evaluative dispositions to self-assessed competencies.

The moderate yet significant belief practice correlation ($r = .461$) invites comparison with the dissonance literature. Widiastuti et al. [23] documented substantial divergences between teachers' stated beliefs and their observable assessment behaviors, attributing these inconsistencies to structural and contextual barriers. The present findings offer a more integrated picture: the teachers in this sample form a relatively coherent group in whom beliefs, knowledge, and practice are genuinely interconnected. Nevertheless, Dixon's [24] research introduces a useful caution even teachers possessing declarative knowledge of effective feedback processes frequently struggled to enact feedback practices that meaningfully advanced student learning, thereby exposing a persistent gap between knowing and doing. Jett [25] documented precisely this pattern, where strong espousal of formative assessment values did not reliably translate into implementation without accompanying procedural knowledge and adequate contextual support. The finding that perceived knowledge ($\beta = .512$) substantially outperforms beliefs ($\beta = .170$) as an independent predictor

provides a plausible account of when such dissonance materializes: a teacher may maintain strong convictions regarding FCA yet fall short in practice if the operational knowledge needed for enactment remains underdeveloped.

The model's explained variance ($R^2 = .389$) is substantial for a two-predictor model in educational research; however, approximately 61% of the variance in practice remains unexplained, underscoring the importance of contextual and structural factors not captured in the present design. Teacher self-efficacy has been identified as a key mediating mechanism between knowledge and practice [43], [44], and Karakaya and Yılmaz [6] specifically demonstrated that self-efficacy partially mediated the attitude practice association, suggesting that future Ethiopian research should explicitly model self-efficacy as a mediator. School-level variables are equally consequential: Andersson and Palm [45] showed that sustained formative assessment implementation depends critically on administrative support and collaborative professional cultures, while De Lisle [46] demonstrated that structural conditions class size, resource availability, and time for collaborative planning can overwhelm individual teacher capacity. Within the Ethiopian context, Figa et al. [16], Oli and Olkaba [18], and Worku Kibret [47] have consistently identified analogous constraints: excessive instructional workloads, large class sizes, and limited feedback mechanisms that render individualized FCA logistically demanding. Incorporating observational measures of practice and structural contextual variables in future research would substantially strengthen the validity of findings currently reliant on self-report data [42], [48].

The concept of formative assessment literacy, as theorized by Li and Ma [49], synthesizes both the procedural knowledge of how to assess and the dispositional understanding of why it matters precisely the combination captured by the present study's knowledge and belief constructs. Leung [22] articulated this integration compellingly, arguing that genuine formative assessment competence requires the development of what may be termed assessment wisdom: the capacity to make principled, context-sensitive judgments about when, how, and why to employ formative strategies. The high intercorrelations among all three constructs suggest that, for this sample, beliefs, knowledge, and practice are developing in concert, constituting a mutually reinforcing system. This pattern stands in contrast to contexts where teachers possess declarative knowledge without practical fluency, or where formative practices are performed ritualistically in the absence of genuine pedagogical conviction [50], [51]. Van der Nest et al. [51] demonstrated that formative assessment activities can cultivate teacher agency most effectively when they simultaneously address knowledge, beliefs, and practical skills suggesting that integrated professional development approaches are best positioned to yield sustainable behavioral change.

The practical implications for Ethiopia's newly implemented curriculum are both direct and pressing. Schildkamp et al.'s [52] systematic review concluded that effective formative assessment implementation requires sustained, concurrent attention to teachers' technical competencies and the belief systems that motivate their continued application. The present data specify the operational hierarchy: perceived knowledge constitutes the essential mechanism. Andersson and Palm [45] further established that professional development is most effective when it is sustained, contextually embedded, and simultaneously addresses both motivational and competence dimensions. Episodic, one-time workshops are unlikely to produce durable behavioral change [22], [50]. Professional development should therefore prioritize practical, classroom-embedded learning experiences that build teachers' operational knowledge of FCA techniques specifically how to elicit and interpret evidence of learning, provide actionable and timely feedback, and calibrate subsequent instruction responsively [53], [48]. Given that perceived knowledge emerged as the dominant predictor, interventions should systematically build teachers' competence through mastery-oriented experiences, structured peer coaching, and collaborative professional inquiry cycles [6], [54]. Simultaneously, the significant contribution of beliefs underscores the value of integrating attitudinal cultivation into professional learning: structured opportunities for teachers to observe and reflect upon the demonstrable impact of formative feedback on student outcomes can reinforce both conviction and operational competence within a unified developmental process [55], [56], [57].

Several limitations of this study warrant explicit acknowledgment. First, exclusive reliance on self-reported data introduces the potential for social desirability bias and common method variance. Ruiz-Primo and Furtak [48] demonstrated that teachers' self-reports of formative practices do not consistently align with observational evidence, a methodological concern that applies directly to the present findings. Second, the cross-sectional design precludes causal inference; the directional influences among beliefs, knowledge, and practice may well be reciprocal or cyclical rather than strictly unidirectional. Longitudinal designs would be needed to trace how these relationships evolve as teachers accumulate experience with the newly implemented curriculum. Third, the sample is drawn exclusively from an urban locality, constraining generalizability to rural or resource-constrained settings. Prior research by Abejehu [13], Amenu [14], and Forsido [58] indicates that rural Ethiopian schools encounter more severe structural constraints that may substantially alter the relational dynamics observed here. Future investigations should purposively include urban, peri-urban, and rural school contexts to enable meaningful comparative analyses. Fourth, the study did not disaggregate findings by subject area; subject-specific differences in assessment cultures and disciplinary pedagogical norms may moderate these relationships, and future research should

examine whether the primacy of perceived knowledge over beliefs holds consistently across disciplines.

Conclusion

This study contributes empirical evidence to the expanding body of scholarship on the internal teacher-level factors that shape FCA adoption in Global South contexts, and within Ethiopia's ongoing curriculum reform initiative in particular. The results delineate a clear predictive hierarchy: while teachers' beliefs concerning the value of FCA constitute a meaningful and independent predictor of their self-reported practice, perceived knowledge emerges as the dominant driver the critical mechanism through which philosophical conviction finds concrete expression in classroom behavior.

These findings carry direct implications for practice. Cultivating robust formative assessment literacy must be positioned at the center of any serious effort to advance FCA implementation under Ethiopia's current curriculum. Professional development that foregrounds practical, evidence-based, and contextually situated knowledge-building is most likely to produce durable and generative behavioral change. Concurrently, the significant contribution of beliefs to practice underscores the importance of integrating attitudinal development into professional learning providing teachers with structured, direct encounters with the effects of formative feedback can simultaneously reinforce the conviction and the competence upon which sustainable practice depends. As Leung [22] observed, transforming assessment practice ultimately requires transforming the interrelationship among what teachers know, what they believe, and what they enact. For Ethiopian teachers navigating the demands of a newly implemented curriculum, the path forward lies in recognizing that genuine formative assessment literacy demands both knowledge and belief with knowledge serving as the indispensable engine of change.

Recommendations

Based on the foregoing findings, the following evidence-based recommendations are offered to key stakeholders:

1. Ministry of Education: Mandate practice-embedded, classroom-based FCA professional development in place of theory-only workshops, consistent with the empirical finding that perceived knowledge is the dominant predictor of practice ($\beta = .512$).
2. Curriculum Developers: Systematically integrate procedural FCA competencies including techniques for eliciting learning evidence, delivering actionable feedback, and adjusting instruction responsively into all national in-service development programs.

3. Teacher Education Colleges: Redesign pre-service assessment courses to prioritize simulated and authentic classroom-based FCA application over declarative knowledge acquisition alone, thereby bridging the gap between theoretical preparation and practical readiness.
4. School Leaders: Institutionalize recurring peer coaching and collaborative professional inquiry structures that provide sustained, contextually anchored developmental support, rather than relying on isolated, episodic professional development events.
5. Teachers: Conduct systematic self-audits of existing FCA knowledge gaps, pursue targeted peer mentoring on specific formative techniques, and document incremental implementation successes to simultaneously reinforce both competence and conviction.
6. Researchers: Conduct observational validation studies to triangulate self-reported practice data, extend sampling frameworks to rural and peri-urban school contexts, and examine whether the predictive hierarchy identified here holds consistently across subject disciplines and school levels.

Ethical Considerations

Written informed consent was obtained from all participants prior to data collection. Participation was entirely voluntary, and all respondents were assured of the confidentiality and anonymity of their data. Ethical approval was granted by the Institutional Review Board of the University of Gondar.

Conflict of Interest

The authors declare no conflict of interest.

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Authors' Contributions

Aragaw Shibabaw: Conceptualization, validation, visualization, investigation, and manuscript review. Sisay Fekadie Molla: Conceptualization, validation, visualization, investigation, and manuscript preparation.

Data Availability

The datasets generated and/or analyzed during the current study are not publicly available due to privacy and ethical restrictions that could compromise participant confidentiality given the identifiable nature of the participating institutions; however, the data are available from the corresponding author upon reasonable request.

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