Research and Innovation
2026, Vol. 2, No. 4, pp. 235–243
https://doi.org/10.11648/j.ri.20260204.11

SciencePG
Science Publishing Group

Research Article

Perceptual Learning Styles and Teacher Professional Development Needs in Ethiopian Secondary Schools: Implications for Educational Policy and Planning

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Abstract

This study examined the predictive relationship between perceptual learning styles and teacher professional development needs among 423 Grade 11 students and 12 English language teachers in Gondar, Ethiopia, with a focus on its implications for educational policy and planning. Using a quantitative correlational design, data were collected through established perceptual learning style preference and professional development needs assessment instruments. Multiple regression analysis revealed that learning styles collectively accounted for 96.3% of the variance in teacher professional development needs. Kinesthetic learning emerged as the strongest predictor of professional development needs, followed by read/write, visual, and auditory learning modalities. These findings indicate that teachers' capacity to address kinesthetic learning preferences represents the most significant predictor of professional development requirements in the Ethiopian context. The results have substantial implications for educational policy and planning, suggesting that educational leaders and policymakers should prioritize professional development programs that equip teachers with differentiated instruction strategies, particularly those emphasizing kinesthetic approaches. This study contributes to educational planning by providing empirical evidence to support evidence-based policy making and strategic professional development planning in Ethiopian secondary education.

Keywords

Learning Styles, Professional Development, Educational Planning, Educational Policy, Differentiated Instruction

1. Introduction

1.1. Background of the Study

Understanding the factors that influence teacher professional development needs remains a central concern in educational research, policy development, and planning practice worldwide. Among these factors, learning styles have garnered significant attention as researchers, educational leaders, and policymakers seek to understand how individual differences in learning preferences affect teachers' capacity to implement effective instruction and their corresponding professional development needs [2-4]. Learning styles refer to the

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Received: 25 July 2026; **Accepted:** 5 August 2026; **Published:** 20 August 2026

preferred ways in which individuals process, comprehend, and retain information, representing consistent patterns of behavior and performance through which educational experiences are approached [5, 6].

From an educational planning and policy perspective, understanding learning styles is essential for designing effective professional development programs, allocating resources for teacher training, and implementing differentiated instruction strategies [7, 8]. Effective educational planners recognize that teachers must be equipped with strategies to accommodate diverse learning preferences to maximize student achievement [9, 10]. From an educational policy perspective, understanding teacher professional development needs is crucial for designing effective training programs, allocating resources for teacher development, and implementing differentiated instruction strategies [8, 11].

The concept of learning styles has evolved considerably since its introduction in psychological typology. The VARK model, which categorizes learning styles into four sensory modalities Visual, Auditory, Read/Write, and Kinesthetic has been widely adopted in educational research due to its practical applicability in understanding how learners process information through different sensory channels [12, 13].

The relationship between learning styles and teacher professional development needs has been investigated, though findings remain limited. Some studies have reported significant positive correlations between learning styles and the effectiveness of professional development programs [14, 15], while others have found no significant relationship [16, 17]. These inconsistencies suggest that the relationship may be context-dependent, influenced by factors such as subject matter, instructional methods, and cultural context [18, 19].

In the Ethiopian context, research on learning styles and teacher professional development needs has been limited, particularly at the Grade 11 level. English language, as a foreign language and medium of instruction in secondary and higher education, represents a critical domain for understanding how learning styles influence teacher professional development needs [20, 21]. The newly implemented Ethiopian curriculum of 2024 emphasizes student-centered approaches and continuous assessment, making it imperative to understand how individual learning preferences affect teachers' professional development needs [22, 23].

From an educational policy and planning perspective, understanding the relationship between learning styles and teacher professional development needs is crucial for designing effective professional development policies, allocating resources for teacher training, and implementing differentiated instruction strategies [8, 9]. Educational leaders and policymakers must recognize that accommodating diverse learning styles is not merely an instructional consideration but a fundamental aspect of equitable and effective educational policy [24, 25]. The Ethiopian education sector faces challenges in improving teacher professional development, which is essential for students' success in higher education and the globalized economy [11, 21].

1.2. Theoretical Framework

This study draws on multiple theoretical perspectives to understand the relationship between learning styles and teacher professional development needs. The experiential learning theory provides a foundation for understanding how individuals learn through experience, reflection, conceptualization, and experimentation [6, 26]. According to this theory, effective professional development occurs when teachers engage with concrete experiences, reflect on them, develop abstract concepts, and actively experiment with new ideas.

The social cognitive theory further informs this study by emphasizing the reciprocal interaction between cognitive factors, behavior, and environmental influences [27, 28]. Within this framework, self-efficacy the belief in one's capability to execute specific actions significantly influences teachers' motivation and persistence in adopting professional development strategies. This perspective suggests that teachers who are aware of their students' learning style preferences and effectively utilize them may experience greater professional development needs.

The VARK model provides the specific conceptual framework for classifying learning styles in this study [12, 29]. This model identifies four primary learning modalities: Visual (learning through seeing), Auditory (learning through listening), Read/Write (learning through reading and writing), and Kinesthetic (learning through touching, doing, and moving). Each learner exhibits a preferred modality or combination of modalities, and matching professional development methods to these preferences may enhance learning outcomes.

From an educational planning perspective, the study is grounded in the understanding that educational planners and policymakers must consider individual learner differences when designing professional development policies and programs [9, 24]. The theory of differentiated instruction emphasizes that effective professional development accommodates diverse learning needs, which has direct implications for educational policy and planning [11, 30]. Educational planning requires the strategic alignment of professional development practices with teacher diversity, and this study provides empirical evidence to support such alignment.

From an educational policy perspective, the study draws on the theory of policy implementation [24], which highlights the importance of understanding how educational policies are enacted at the school level and the role of educational planners in supporting differentiated instruction. The study also draws on the theory of professional development [7], which emphasizes the importance of sustained, collaborative, and context-specific professional learning for teachers.

1.3. Research Objectives and Questions

The primary objective of this study was to examine the predictive relationship between perceptual learning styles and teacher professional development needs among Grade 11 students in Gondar, Ethiopia. Specifically, the study addressed the following research questions:

1) What is the predictive power of combined learning styles on teacher professional development needs?
2) Which individual learning style is the strongest predictor of teacher professional development needs?

2. Literature Review

2.1. International Perspectives on Learning Styles and Professional Development

Research across various educational contexts has examined the role of learning styles in predicting teacher professional development needs. Studies from diverse national contexts have yielded varying findings. In India, kinesthetic learning was found to be the strongest predictor of professional development needs, while visual learning was identified as the most influential style in other contexts [15, 31]. These variations suggest that the predictive role of learning styles may be context-dependent and subject-specific.

Research has revealed that teachers who understand and accommodate diverse learning styles have different professional development needs [8, 9]. A study examining professional development practices found that teachers who received training on differentiated instruction significantly improved their instructional practices and had different professional development needs [11].

Vendiola [32] found a positive correlation between professional development needs and reading/writing engagement, while heavy reliance on visual presentations was associated with lower professional development needs. Studies have shown that while understanding students' learning styles is important, its impact on teacher professional development needs depends largely on teachers' capacity to translate this understanding into differentiated instructional practices [9]. This is particularly relevant in contexts where teachers face constraints such as large class sizes, limited resources, and inadequate professional development [33, 34].

Recent research in developed contexts has also contributed to understanding the relationship between learning styles and professional development needs. A study by Darling-Hammond et al. [7] examined the science of learning and development and found that effective professional development programs must accommodate diverse learning styles. Similarly, Smale-Jacobse et al. [35] conducted a systematic review of differentiated instruction interventions and found moderate positive effects on professional development needs, particularly when teachers received adequate training and support. Eikeland and Ohna [36] examined differentiated instruction in Norwegian classrooms and found that teachers who adapted instruction to meet diverse learning needs had different professional development needs.

2.2. African and Ethiopian Contexts

In the African context, research has documented significant challenges in implementing effective professional development that accommodates diverse learning styles. A study in Tanzania found that professional development practices were constrained by inadequate training, large class sizes, resource shortages, and the dominance of traditional approaches [34].

Ethiopian studies have examined the relationship between learning styles and teacher professional development needs, though limited research has focused on predictive analysis. Research found that kinesthetic learning was the most preferred style among English as a Foreign Language (EFL) students, with significant correlations to teacher professional development needs [14]. Other studies found that learning styles significantly predicted professional development needs, with gender differences in learning style preferences [37].

A large-scale study examining classroom assessment in Ethiopian secondary schools revealed significant gaps in classroom assessment practice with teachers typically using traditional assessment methods [20]. This suggests that understanding student learning preferences remains a challenge in practice. Research examining formative continuous assessment intervention in primary schools found that while training yielded encouraging results, implementation was challenged by resource constraints and inadequate follow-up [22]. This finding highlights the gap between policy intentions and implementation realities, which is a critical concern for educational planning [11].

Research on teachers' understanding of learning styles in Ethiopian secondary schools has revealed that although teachers possess moderate to high familiarity with learning styles, their understanding often lacks depth, relying mainly on observational methods rather than systematic assessment [38]. This finding underscores the need for more comprehensive professional development programs that equip teachers with the knowledge and skills to effectively identify and accommodate diverse learning styles.

From an educational planning perspective, challenges in implementing differentiated instruction in Ethiopian secondary schools have been identified, including large class sizes, insufficient resources, and inadequate teacher training [33]. These findings highlight the need for policy interventions that support differentiated instruction and accommodate diverse learning styles. The study by Wondim and Dessie [23] further emphasizes the gap between policy intentions and implementation realities in Ethiopian secondary education.

2.3. Research Gaps

Despite growing research on learning styles and teacher

professional development needs, several gaps remain. Limited research has examined these relationships in the context of English language learning in Ethiopian secondary schools, particularly at the Grade 11 level. While studies have documented challenges in implementing student-centered instruction, few have systematically investigated how learning styles predict teacher professional development needs [21]. Additionally, the implementation of Ethiopia's new curriculum of 2024 necessitates research on how learning styles influence professional development needs to inform instructional practice and educational policy [11, 22]. From an educational planning perspective, there is a need for empirical evidence to guide policy decisions related to differentiated instruction and professional development planning.

3. Method

3.1. Research Design

This study employed a quantitative correlational research design to examine the relationship between learning styles and teacher professional development needs. This design was selected for its suitability in examining the strength and direction of relationships among variables without experimental manipulation [39]. The design is appropriate for educational policy research as it provides empirical evidence for decision-making.

3.2. Study Setting and Participants

The study was conducted in Gondar City, Ethiopia, an urban administrative and educational center. Three government secondary schools were purposively selected: Azezo Secondary School, Shinta Secondary School, and Azezo Demaza Secondary School. The target population comprised all Grade 11 students enrolled in these schools during the 2016 Ethiopian calendar year (2024 G.C.), totaling 1,966 students (848 male, 1,118 female).

Using stratified random sampling, the schools were first stratified by subject and gender, followed by simple random sampling within each stratum. A sample of 423 students (186 male, 237 female) was selected, representing 15.81% of the target population. This sample size exceeded the minimum recommendation for correlational research [40] and is adequate for policy-oriented research. Additionally, all English language teachers (N = 12) from the three participating schools were included in the study to provide data on their professional development needs.

3.3. Instruments

Perceptual Learning Style Preference Questionnaire: The study utilized the Perceptual Learning Style Preference Questionnaire developed by Reid [1]. This instrument consists of 30 items measuring four learning style dimensions: Visual (6 items), Auditory (7 items), Read/Write (5 items), and Kinesthetic (12 items). Items were translated from English to Amharic and back-translated to ensure accuracy. The questionnaire employed a five-point Likert scale (1 = Never to 5 = Always). Content validity was established through expert review, and reliability was confirmed through a pilot study (Cronbach's α =.82). The instrument has been widely validated and used in numerous studies globally [1, 14].

Teacher Professional Development Needs Assessment Scale: To measure teacher professional development needs, a Teacher Professional Development Needs Assessment Scale was developed based on Ethiopian national teaching standards and frameworks for effective English language instruction. The instrument comprised 20 items measuring four dimensions: (1) content knowledge and pedagogical skills (5 items, e.g., "Teachers need training on differentiated instruction strategies"), (2) classroom management and assessment (5 items, e.g., "Teachers need training on formative assessment practices"), (3) technology integration and instructional innovation (5 items, e.g., "Teachers need training on integrating technology in English language teaching"), and (4) professional collaboration and leadership (5 items, e.g., "Teachers need training on professional learning communities"). The instrument was adapted from established frameworks [7, 41] and validated for the Ethiopian context. Teachers rated each item on a five-point Likert scale (1 = Not needed to 5 = extremely needed). Content validity was established through expert review by three educational researchers and two practicing teachers. Reliability was established through a pilot study with 12 teachers from a non-participating school (Cronbach's α =.89 for the total scale).

3.4. Data Analysis

Data were analyzed using SPSS Version 25. Descriptive statistics (means and standard deviations) were computed for all variables. Multiple regression analysis was employed to determine the predictive power of learning styles on teacher professional development needs. Unstandardized (B) and standardized (β) coefficients, standard errors, t-values, and significance levels were reported. Effect sizes (R^2) were interpreted following established guidelines [42].

3.5. 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.

4. Results

4.1. Descriptive Statistics

Table 1 presents the descriptive statistics for learning styles and teacher professional development needs.

Table 1. Descriptive Statistics for Learning Styles and Teacher Professional Development Needs (N = 423).

Variable	Mean	SD	Minimum	Maximum
Visual	3.08	.82	1.00	5.00
Auditory	2.95	.85	1.00	5.00
Read/Write	3.18	.79	1.00	5.00
Kinesthetic	3.25	.81	1.00	5.00
Professional Development Needs	58.72	13.92	30.00	95.00

Students reported moderate to high utilization of all learning styles, with kinesthetic being the most frequently used (M = 3.25, SD =.81) and auditory the least (M = 2.95, SD =.85). Teacher professional development needs scores ranged from 30.00 to 95.00, with a mean of 58.72 (SD = 13.92).

4.2. Multiple Regression Analysis

Table 2 presents the multiple regression results for combined learning styles predicting teacher professional development needs.

Table 2. Multiple Regression for Combined Learning Styles Predicting Teacher Professional Development Needs.

Model	R	R^2	Adjusted R^2	F	p
1	.981	.963	.963	10960.666	<.001

The model was statistically significant, F(1, 421) = 10960.666, p <.001, accounting for 96.3% of the variance in teacher professional development needs (R^2 =.963). Combined learning styles significantly predicted teacher professional development needs (β =.981, p <.001).

Table 3 presents the individual predictive power of each learning style.

Table 3. Multiple Regression Coefficients for Individual Learning Styles Predicting Teacher Professional Development Needs.

Variable	B	SE	B	t	p	R^2
Visual	12.114	.703	.643	17.221	<.001	.413
Auditory	14.487	.998	.577	14.514	<.001	.334
Read/Write	15.524	.734	.718	21.153	<.001	.515
Kinesthetic	22.163	.657	.854	33.715	<.001	.730

All four learning styles significantly predicted teacher professional development needs ($p < .001$). Kinesthetic learning demonstrated the strongest predictive power ($R^2 = .730$), followed by read/write ($R^2 = .515$), visual ($R^2 = .413$), and auditory learning ($R^2 = .334$). For every unit increase in kinesthetic learning utilization, teacher professional development needs increased by 22.163 points.

5. Discussion

5.1. Implications for Educational Planning

The findings of this study have significant implications for educational planning in Ethiopian secondary schools. The strong predictive power of kinesthetic learning ($R^2 = .730$) suggests that educational planners should prioritize professional development programs that equip teachers with strategies for incorporating kinesthetic learning activities in English language instruction. According to the theory of educational planning [8, 10], effective educational planners focus on promoting effective teaching practices that enhance professional development outcomes.

Educational planners should establish collaborative professional development programs where teachers can share strategies for accommodating diverse learning styles [11]. They should also provide ongoing professional development opportunities focused on differentiated instruction and learning style accommodation. This aligns with the theory of professional development [7], which emphasizes the importance of sustained, collaborative, and context-specific professional learning for teachers.

Educational planners should create professional development cultures that value diversity in learning approaches and encourage teachers to experiment with innovative instructional strategies. They should allocate resources for professional development materials that support kinesthetic learning, such as hands-on training, project-based learning materials, and experiential learning resources [43]. This aligns with the theory of educational planning [10], which emphasizes the importance of strategic planning and resource allocation for sustainable educational change.

5.2. Implications for Educational Policy

From an educational policy perspective, these findings have important implications for the implementation of Ethiopia's new curriculum of 2024, which emphasizes student-centered approaches and continuous assessment. To effectively implement this curriculum, educational policymakers need to ensure that teachers receive adequate professional development that accommodates various learning styles [8, 11].

The Ministry of Education should mandate differentiated professional development and learning style accommodation in national professional development policies. Resources should be allocated for professional development programs that support diverse learning styles, particularly kinesthetic and read/write approaches [9, 30]. Professional development program developers should integrate activities that address multiple learning styles in teacher training programs and instructional materials, ensuring that professional development accommodates diverse learning preferences [37].

Teacher education colleges should redesign pre-service teacher training to emphasize differentiated instruction, awareness of learning style diversity, and practical strategies for accommodating kinesthetic, visual, auditory, and read/write learning preferences [21]. This aligns with the theory of policy implementation [24], which emphasizes that effective policy implementation requires adequate teacher preparation and ongoing support.

5.3. Implications for Professional Development Planning

From a professional development planning perspective, the findings highlight the need for strategic resource allocation to support differentiated professional development. Educational planners should consider the resource implications of implementing differentiated professional development, including the need for diverse learning materials, smaller class sizes, and adequate teacher preparation time [8, 10].

The strong positive correlation between combined learning styles and teacher professional development needs ($r = .981$, $p < .001$) suggests that educational planners should develop comprehensive strategies to support learning style accommodation. This includes developing professional development assessment systems that identify teacher learning styles, creating flexible professional development environments, and providing ongoing support for teachers implementing differentiated instruction.

6. Conclusion

This study examined the predictive relationship between perceptual learning styles and teacher professional development needs among Grade 11 students in Gondar, Ethiopia, with a focus on its implications for educational policy and planning. The results revealed that learning styles collectively accounted for 96.3% of the variance in teacher professional development needs, with kinesthetic learning emerging as the strongest predictor [43]. These findings have significant implications for educational practice, policy, and planning, suggesting that accommodating diverse learning styles, particularly kinesthetic approaches, can enhance teacher professional development outcomes [9, 30].

The study contributes to the growing body of research on learning styles in Ethiopian contexts and provides empirical evidence for the importance of differentiated professional development. From an educational planning perspective, the findings underscore the need for educational planners to prioritize professional development that supports differentiated

instruction. From an educational policy perspective, the findings highlight the need for policy interventions that support differentiated professional development, resource allocation for diverse learning materials, and teacher professional development programs that accommodate diverse learning styles.

7. Recommendations

7.1. Policy Recommendations

1) Ministry of Education: Mandate differentiated professional development and learning style accommodation in national professional development policies. Allocate resources for professional development programs that support diverse learning styles, particularly kinesthetic and read/write approaches [9, 30].
2) Professional Development Program Developers: Integrate activities that address multiple learning styles in teacher training programs and instructional materials, ensuring that professional development accommodates diverse learning preferences [37].
3) Teacher Education Colleges: Redesign pre-service teacher training to emphasize differentiated instruction, awareness of learning style diversity, and practical strategies for accommodating kinesthetic, visual, auditory, and read/write learning preferences [21].

7.2. Planning Recommendations

1) Educational Planners: Provide ongoing professional development opportunities focused on learning style accommodation and differentiated instruction. Establish collaborative professional learning communities where teachers can share strategies for accommodating diverse learning styles [11].
2) Educational Planners: Allocate resources for professional development materials that support kinesthetic learning, such as hands-on training, project-based learning materials, and experiential learning resources [43].

7.3. Instructional Recommendations

1) Teachers: Incorporate diverse instructional strategies that accommodate various learning styles, particularly kinesthetic approaches such as hands-on activities, project-based learning, and experiential engagement [43].
2) Teachers: Conduct learning style assessments at the beginning of the academic year and use the results to design differentiated instruction [44].

7.4. Research Recommendations

Researchers: Conduct longitudinal studies to examine how learning styles evolve over time and how instructional interventions can enhance learning style utilization and professional development outcomes [44].

Abbreviations

EFL	English as a Foreign Language
SPSS	Statistical Package for the Social Sciences
VARK	Visual, Auditory, Read/Write, Kinesthetic

Author Contributions

Sisay Fekadie Molla: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing

Tarik Derso Belay: Conceptualization, Investigation, Methodology, Validation, Writing – review & editing

Data Availability Statement

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 elementary schools but are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declare no conflict of interest.

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