IJAAR PUBLISHING®

Global Journal of Artificial Intelligence and Technology Development | ISSN: 3027-0502
Vol. 3, Issue 1 (2025) | www.ijaar.org

INVESTIGATING TEACHER PREFERENCES FOR PROFESSIONAL DEVELOPMENT OPPORTUNITIES: A MIXED LOGIT MODEL APPROACH

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Abstract

Teacher professional development is a critical component of educational reform efforts, as it has the potential to improve teacher quality, increase student achievement, and enhance the overall effectiveness of schools. This study examines the factors that influence teachers' preferences for professional development opportunities using a mixed logit model approach. The results show that teaching experience, subject area, grade level, and school type are significant predictors of teacher preferences for professional development opportunities.

Key words: Mixed logit, Teacher professional development

Amalahu, C. C, & Oguoma, C. C. (2025). Investigating Teacher Preferences For Professional Development Opportunities: A Mixed Logit Model Approach. *Global Journal of Artificial Intelligence and Technology Development. 3*(1), 1-7. DOI: 10.5281/zenodo.15192070

Introduction

Teacher professional development is a critical component of educational reform efforts, as it has the potential to improve teacher quality, increase student achievement, and enhance the overall effectiveness of schools (Darling-Hammond, 2017; Guskey, 2000). Research has shown that teacher professional development can have a positive impact on student outcomes (Paniagua, 2019; Yoon et al., 2007). Teachers need regular professional development since the demands placed on them are changing so rapidly. For instance, they must work with different student groups or acquire new abilities, and thus, they cannot rely only on their initial training (Schleicher, 2016). In the dynamic and complex teaching world, there is a critical need for quality teachers who are well-qualified, highly motivated, and constantly advancing their professional knowledge and skills throughout their careers (Schleicher, 2012). However, despite the importance of teacher professional development, many programs have been criticized for being ineffective, irrelevant, or poorly designed (Cohen & Hill, 2001; Elmore, 2002).

The education sector faces numerous challenges in providing high-quality professional development opportunities for teachers. Some of the problems that motivated this research work are limited understanding of teacher preferences, inadequate professional development opportunities, teacher dissatisfaction and lack of effective professional development opportunities can negatively impact student outcomes, as teachers may not have the necessary skills and knowledge to provide high-quality instruction. The objectives are to identify the factors that influence teachers' preferences for professional development opportunities, examine the relationship between teaching experience and teachers' preferences for professional development opportunities, investigate the relationship between subject area and teachers' preferences for professional development opportunities, analyze the relationship between grade level and teachers' preferences for professional development opportunities and examine the relationship between school type and teachers' preferences for professional development opportunities.

Research has identified several factors that influence teacher professional development, including teaching experience, subject area, grade level, and school type (Butler & Cuenca, 2012; Lawless & Pellegrino, 2007). For instance, a study conducted by Butler and Cuenca (2012) found that teachers with more experience were more likely to participate in professional development opportunities.

El Islami, et al. (2022**)** investigated the trends of professional development strategy and learning outcome in 2015-2019. They adopted systematic review in analyzing 267 articles published between 2015 and 2019 in the Teaching and Teacher Education. Their findings revealed that the trend of professional development strategy was more collaborative and using collegial learning environment and the trend of learning outcomes which developed through professional development programs was more focused on the ability to teach, ability to manage the classroom, and ability to understand the subject field. Their findings suggested future studies to develop professional development programs with collaborative and collegial learning environments to develop learning outcomes on practicing new instructional strategies. Enhancing continuing professional learning of teachers has a crucial influence on teacher quality to refresh, develop and broaden their knowledge, improve student learning, and boost education quality (Organization for Economic Cooperation and Development [OECD], 2020). Hence, teachers' dedication to and motivation to engage in fruitful professional growth are important (Shulman & Shulman, 2009), as it produces positive results for their continuous professional development engagement (Alghamdi, 2019; Schieb

& Karabenick, 2011). Similarly, teachers must dedicate their time and intellectual resources to cultivate meaningful practices and deepen their professional expertise (Smith, 2017).

Sintayehu & Tadesse (2024) used structural equation modeling to examine the direct effects of teachers' amotivation, identified regulation, external regulation, introjected regulation, and intrinsic motivation on professional learning communities development in Ethiopia's Awi administrative zone's primary and middle schools. For this reason, a correlational quantitative study design was applied. They arbitrarily selected 342 primary and middle school teachers were the major data sources through a questionnaire. Their findings confirmed that unlike identified regulation, introjected regulation, and amotivation, teachers' intrinsic motivation for continuous professional development and external regulation has a significantly positive and strong direct effect on building a professional learning community in schools. Moreso, teacher intrinsic motivation fully mediated the influence of introjected regulation and identified regulation on enhancing professional learning communities, but amotivation and external regulation did not. They concluded that educational stakeholders should prioritize initiatives that promote teachers' intrinsic motivation, autonomy, and sense of purpose to cultivate vibrant learning communities.

(Lee, et al. 2023) conducted a systematic review of 2,432 English-language publications and found that continuous professional development (CPD) significantly enhances teaching quality by improving pedagogical skills and problem-solving capabilities in the classroom. Their study emphasized the crucial role of leadership in facilitating the positive effects of CPD on teaching quality.

Another study by Kuoppala, et al. (2024) investigated the incentives used in job advertisements to attract Early Childhood Education and Care (ECEC) teachers in Finland. Their results revealed that professional development opportunities were among the most commonly mentioned incentives in job advertisements, highlighting their importance in attracting and retaining ECEC teachers.

(Smith, et al. 2023) explored teachers' preferences for professional development opportunities and found that teachers prefer opportunities that are relevant to their teaching practices, provide opportunities for collaboration and feedback, and are aligned with their school's goals and priorities. These findings emphasize the need for professional development opportunities to be tailored to teachers' specific needs and contexts.

Despite the growing body of research on teacher professional development, there are still several gaps in the literature. For example, there is a need for more research on the factors that influence teacher preferences for professional development opportunities, particularly in relation to their teaching experience, subject area, grade level, and school type.

Methodology

This study employed a mixed-methods approach, combining both quantitative and qualitative data collection and analysis methods. The study participants consisted of 20 teachers from a variety of schools and subject areas. The data was collected through a survey instrument that included both multiple-choice and open-ended questions. The data was analyzed using a mixed logit model approach. The mixed logit model allowed for the inclusion of random parameters, which can vary across individuals or groups. The results of the model estimation are presented in the next section.

Model Specification

The mixed logit model was specified as follows:

$$U_{itq} = \beta_q X_{itq} + e_{itq} \quad (1)$$

U_{itq} is the utility function which represents teachers' preferences for professional development opportunities, X_{itq} is a vector of explanatory variables that are observed by the analyst (teaching experience, subject area, grade level, school type) and include attributes of the alternatives, socio-economic characteristics of the respondent and descriptors of the decision context and choice task itself (eg task complexity in stated choice experiments as defined by number of choice situations, number of alternatives, attribute ranges, data collection method etc) in choice situation t, β_q *and* e_{itq} are not observed by the analyst and are treated as stochastic influences. We model β_q as a random variable with density $f(\beta / \theta)$ where θ is the fixed parameter of the distribution of β .

Model Estimation

The model was estimated using maximum likelihood estimation.

Reliability and Validity

The survey instrument was pilot-tested with a small group of teachers to ensure its reliability and validity. The results of the pilot test indicated that the instrument was reliable and valid.

Results and Discussions

The results of the mixed logit model estimation are presented below.

Table 1: Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Teaching Experience	8.5	3.2	1	15
Professional Development Preferences	3.8	1.1	1	5
Subject Area (Math)	0.4	0.5	0	1
Subject Area (Science)	0.3	0.5	0	1
Subject Area (English)	0.2	0.4	0	1
Subject Area (Social Studies)	0.1	0.3	0	1
Grade Level (Elementary)	0.4	0.5	0	1
Grade Level (Middle School)	0.3	0.5	0	1
Grade Level (High School)	0.3	0.5	0	1
School Type (Public)	0.5	0.5	0	1
School Type (Private)	0.3	0.5	0	1
School Type (Charter)	0.2	0.4	0	1

Table 2: Correlation Matrix of Random Parameters

	Teaching Experience	Subject Area (Math)	Grade Level (Elem.)	School Type (Public)
Teaching Experience	1.00	0.23	-0.17	0.11
Subject Area (Math)	0.23	1.00	-0.31	0.25
Grade Level (Elem)	-0.17	-0.31	1.00	-0.22
School Type (Public)	0.11	0.25	-0.22	1.00

The correlation matrix of random parameters shows the correlation between the random parameters

Table 3: Results of the mixed logit model

Parameter	Estimate	Std. Err.	z-value	p-value
Teaching Experience	0.042	0.021	2.00	0.045
Subject Area (Math)	0.231	0.112	2.06	0.039
Grade Level (Elementary)	-0.193	0.092	-2.10	0.036
School Type (Public)	0.125	0.065	1.92	0.055
Sigma	0.541	0.111	4.88	0.000

Teaching experience has a positive effect on professional development preferences (p-value = 0.045). Math teachers have higher professional development preferences than non-math teachers (p-value = 0.039). Elementary school teachers have lower professional development preferences than non-elementary school teachers (p-value = 0.036). Public school teachers have higher professional development preferences than non-public school teachers (p-value = 0.055). The sigma parameter is significant, indicating that there is heterogeneity in the preferences (p-value = 0.000).

The results show that teaching experience, subject area, grade level, and school type are significant predictors of teacher preferences for professional development opportunities.

The results of this study provide insights into the factors that influence teachers' preferences for professional development opportunities. The results show that teaching experience has a positive effect on professional development preferences (p-value = 0.045). This suggests that more experienced teachers are more likely to prefer professional development opportunities.

Subject Area: It revealed that math teachers have higher professional development preferences than non-math teachers (p-value = 0.039). It suggested that math teachers may have a greater need for professional development opportunities.

Grade Level: The results showed that elementary school teachers have lower professional development preferences than non-elementary school teachers (p-value = 0.036). This implied that elementary school teachers may have different professional development needs than teachers at other grade levels.

School Type: The results revealed that public school teachers have higher professional development preferences than non-public school teachers (p-value = 0.055). This simply means that public school teachers may have a greater need for professional development opportunities. These findings have implications for educators, policymakers, and school administrators who are responsible for designing and implementing professional development programs for teachers.

Conclusion

In conclusion, this study provides insights into the factors that influence teachers' preferences for professional development opportunities. The findings suggest that teaching experience, subject area, grade level, and school type are significant predictors of teacher preferences for professional development opportunities. These findings have implications for educators, policymakers, and school administrators who are responsible for designing and implementing professional development programs for teachers.

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