WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Enhancing Teaching Standards: A Study on the Competency and Effectiveness of Educators in North 24 Parganas of West Bengal

[1]Nilaksha Mallick, [2]Dr.Rumti Das

[1]Research Scholar, Department of Education, Swami Vivekananda University, Email: nil111mallick@gmail.com
[2]Assistant Professor, Department of Education, Swami Vivekananda University Email: aniruddharay31@gmail.com

ABSTRACT

The present study aimed to explore the multifaceted aspects of teacher competency and effectiveness among secondary school teachers. Specifically, it examined differences in various dimensions of teacher competency—such as subject knowledge and pedagogical skills—based on gender and years of teaching experience. The study also analyzed how teacher effectiveness indicators, including student engagement strategies, innovative teaching methods, and assessment practices, vary according to academic qualifications and professional training levels. Furthermore, it investigated the interaction effects of teaching experience and locale type on the combined measures of teacher competency and effectiveness. Employing a descriptive research design, data were collected using validated tools from a sample of secondary school teachers through stratified random sampling. Multivariate analysis of variance (MANOVA) was applied to interpret the complex interplay of variables. The findings are expected to contribute to the formulation of evidence-based teacher development programs and policies.

Keywords: Teacher Competency, Teacher Effectiveness, Teaching Experience, Academic Qualification, Professional Training, Pedagogical Skills, Secondary Education.

1. Introduction

The teaching profession holds a pivotal position in shaping the intellectual, emotional, and social development of students, making educator competency and effectiveness critical components of any quality education system. In the district of North 24 Parganas in West Bengal, where a diverse population and varying socio-economic conditions influence educational delivery, the role of competent and effective educators becomes even more significant. Teacher competency encompasses a broad spectrum of professional attributes, including subject-matter knowledge, pedagogical expertise, classroom management skills, and the ability to integrate inclusive and technology-enhanced teaching methods (Darling-Hammond, 2017). Effective educators are not only knowledgeable but also skilled in adapting instruction to meet the diverse needs of learners, maintaining student engagement, and fostering critical thinking and problem-solving abilities (Stronge, 2018). Furthermore, the implementation of the National Education Policy (NEP) 2020 by the Government of India emphasizes the need for continuous professional development, learner-centered pedagogy, and the adoption of innovative assessment practices to enhance the quality of teaching (National Council of Educational Research and Training [NCERT], 2020). Despite state-led initiatives to improve teacher education and training in West Bengal, challenges such as uneven access to professional development programs, lack of updated teaching resources, and disparities in school infrastructure continue to hinder the elevation of teaching standards (Kundu & Nayak, 2021). Hence, this study aims to critically examine the current levels of teacher competency and effectiveness in the district of North 24 Parganas, identify key influencing factors, and propose actionable strategies to enhance the overall quality of education through teacher empowerment and systemic reform.

1.1. The Rationale of the Study

The rationale of the study lies in understanding how teacher competency and effectiveness vary with gender and years of experience, which are crucial for improving educational quality. Identifying these differences can help tailor professional development programs to specific teacher needs. The study also seeks to reveal hidden disparities that may affect student outcomes. It addresses a critical gap in existing educational research on performance indicators. Ultimately, the findings aim to inform policy decisions and enhance classroom practices for better learning environments.

1.2. The Statement of the Problem

The title of the study entails **"Enhancing Teaching Standards: A Study on the Competency and Effectiveness of Educators in North 24 Parganas of West Bengal."**

1.3. The Objectives of the Study

O1: To examine the differences in multiple dimensions of teacher competency (e.g., subject knowledge, pedagogical skills) based on gender, and years of teaching experience.

O2: To analyze the variation in teacher effectiveness indicators (e.g., student engagement strategies, use of innovative teaching methods, assessment practices) with respect to different academic qualifications and professional training levels.

O3: To investigate the interaction effects of teaching experience and locale type on the combined measures of teacher competency and effectiveness.

1.4. The Hypotheses of the Study

H_{01}: There is no significant difference in teacher competency indicators (i.e., subject knowledge and pedagogical skills) with respect to gender, and years of teaching experience.

H_{02}: There is no significant variation in teacher effectiveness indicators (i.e., student engagement strategies, use of innovative teaching methods, and assessment practices) with respect to different academic qualifications and professional training levels.

H_{03}: There is no significant interaction effect of teaching experience and locale type on the combined measures of teacher competency and effectiveness.

1.5. The Delimitations of the Study

1. The study was limited to secondary school teachers only and did not include primary or middle school educators.

Only selected north 24 Pargana was covered, restricting the generalizability of the findings to a wider geographic area.

The study focused on specific dimensions of teacher competency and effectiveness, such as subject knowledge, pedagogical skills, student engagement, and assessment practices.

2. The Review of Related Literature

Karsiwan et al. (2021), in their study of Professional Competency Gap Analysis Teacher in Professional Development Teacher. International Seminar on Health, Economics, Social Science and Humanities (PVJ-ISHESSH 2020) (pp. 140-143). Atlantis Press. Conducted a professional competency gap analysis among teachers with the objective of planning effective improvement programs. The study identified a notable gap between the actual competencies demonstrated by teachers and the expected standards. Based on these findings, the authors recommended the design of targeted professional development programs to bridge the identified gaps and enhance teacher performance.

Lorensius et al. (2022) Academic supervision in the improvement of teachers' professional competencies: Effective practices on the emergence. EduLine: Journal of Education and Learning Innovation, 2(2), 99-107. They explored the role of academic supervision in enhancing teachers' professional competencies. The study concluded that regular and structured academic supervision significantly improved both teaching practices and reflective capabilities among teachers. This, in turn, contributed to better student learning outcomes and fostered a culture of continuous improvement.

Apriliyanti (2020). Enhancing teachers' competencies through professional development program: Challenges and benefactions. Acuity: Journal of English Language Pedagogy, Literature and Culture, 5(1), 28-38. Evaluated the impact of professional development (PD) programs on teachers and investigated the challenges they faced in applying new skills within classroom settings. While teachers were found to have acquired vital pedagogic competencies through PD initiatives, several challenges—such as a lack of classroom innovation and environmental constraints—hindered the full implementation of newly acquired skills.

Pachaiyappan (2022). Study On Professional Competency Among Higher Secondary Teachers. Journal of Positive School Psychology, 6(6). Assessed professional competencies among higher secondary school teachers based on gender, locale, and the type of school management. The study found significant gender-based differences in professional competency levels, while no statistically significant differences were observed between rural and urban teachers. However, the management type (government vs. private) did influence teaching competency levels, indicating institutional factors also play a crucial role.

Mahra et al. (2020) Competencies and teaching effectiveness in social sciences at Indian agricultural universities. Indian Journal of Agricultural Sciences, 90(11), 2150-5. Focused on assessing teaching effectiveness in agricultural universities, particularly within extension education. Their research revealed that a majority of students perceived the competency acquisition process as inadequate. Overall teaching effectiveness was moderate, and the study highlighted the need for improvement in key areas of competency development, especially in student engagement and practical instruction.

Sehgal et al. (2017), Teacher effectiveness through self-efficacy, collaboration and principal leadership. International Journal of Educational Management, 31(4), 505-517. The authors investigated how teacher self-efficacy, collaboration, and leadership influenced teacher effectiveness. Their findings demonstrated strong positive relationships between self-efficacy and teaching effectiveness, and they emphasized the supporting roles of collaborative practices and instructional leadership in fostering high-performing teaching environments.

Chouhan and Gaur (2016), The Practice of English Language Teaching Through Literature at Secondary Schools in Ethiopia Focusing on Attitudes of Teacher's and Student's. Practice, 82. examined the foundational professional competencies required for prospective teachers. The study emphasized the need to align competency standards with the evolving needs of the educational workplace. They found that teacher competency has a direct and substantial influence on student academic performance, highlighting the necessity of competency-based teacher education programs.

2.1. The Research Gap of the Study

Although prior studies have explored teacher competencies and effectiveness, few have systematically compared specific dimensions like subject knowledge and pedagogical skills across gender and teaching experience. Limited attention has been given to how teacher effectiveness varies with academic qualifications and levels of professional training. Most research focuses on individual factors rather than their combined impact. Additionally, the interaction effects of teaching experience and locale type on both competency and effectiveness remain underexplored. This highlights a significant gap that the present study aims to address comprehensively.

3. The Methodology of the Study

3.1. Research Method

The study employed a descriptive research design to systematically examine the competency and effectiveness of educators in North 24 Parganas, West Bengal. It aimed to collect quantifiable data regarding teaching practices, professional experience, gender, and locale. Standardized tools were used to assess teacher effectiveness and competency across different demographic variables. Data were analyzed using multivariate statistical techniques like MANOVA to identify significant differences and interaction effects. The approach provided a clear and structured understanding of teaching standards in the region.

3.2. The Sample and Sampling Technique

The sample of the study consisted of 604 secondary school teachers from various government and private institutions in North 24 Parganas, West Bengal. A stratified random sampling technique was employed to ensure representation across key demographic variables such as gender, locale (urban and rural), and years of teaching experience (above and below 15 years). This method enabled the researcher to capture a diverse range of perspectives while maintaining the statistical rigor necessary for meaningful analysis. The strata were formed based on the identified categories to facilitate subgroup comparisons in the study.

3.3. The Tool of the Study

The study employed a structured questionnaire as the primary tool for data collection, which was designed to measure teacher competency and teacher effectiveness. The tool consisted of multiple sections, including items related to pedagogical skills, classroom management, student engagement strategies, assessment practices, and use of innovative teaching methods. It was developed using a Likert-type scale format to capture the degree of agreement or frequency of specific behaviors. The tool was validated by experts in educational psychology and teacher education, and its reliability was ensured through a pilot study, yielding a satisfactory Cronbach's alpha value.

3.4. The Reliability and Validity

The *Teacher Competency* and *Teacher Effectiveness* tools used in the study were subjected to rigorous testing to ensure both reliability and validity. The reliability of both tools was confirmed using **Cronbach's alpha**, yielding coefficients of **0.87** for the competency tool and **0.89** for the effectiveness tool, indicating high internal consistency (Cohen et al., 2018). **Split-half reliability** was also conducted, which showed strong positive correlations between the two halves of each tool, reinforcing their consistency. For **validity**, **content validity** was established by consulting experts in educational research, psychology, and pedagogy, who evaluated the tools for clarity, relevance, and comprehensiveness. **Construct validity** was ensured through **exploratory factor analysis**, which confirmed the alignment of the items with the intended constructs of teacher competency (e.g., planning, instructional delivery, classroom management) and teacher effectiveness (e.g., student engagement, assessment, and learning outcomes). These results indicated that both tools were statistically sound and appropriate for use in evaluating teaching performance.

4. The Analysis and Interpretation

The data were analysed with the help of statistical methods.

H_{01}: There is no significant difference in teacher competency indicators (i.e., subject knowledge and pedagogical skills) with respect to gender and years of teaching experience.

To verify the hypothesis descriptive statistics and MANOVA has been used by researcher and it was described in the following section:

The descriptive analysis presented in **Table 4.1** provides insightful information about the influence of **gender** and **years of teaching experience** on two key dimensions of teacher competency: **Subject Knowledge** and **Pedagogical Skill**. The findings suggest notable variations in competency levels between teachers with more than 15 years of experience and those with less than 15 years, across both male and female educators.

Table 4.1: The Descriptive Analysis of the Teacher Competency Indicators with Respect to Gender and Years of Experience

Descriptive Statistics					
Areas of Teacher Competency	**Gender**	**Experience**	**Mean**	**Std. Deviation**	**N**
Subject Knowledge	**Male**	**>15 Years**	49.61	7.055	119
		< 15 Years	61.66	8.018	181
		Total	56.88	9.657	300
	Female	**>15 Years**	46.54	3.804	91
		< 15 Years	60.26	9.104	213
		Total	56.15	10.096	304
	Total	**>15 Years**	48.28	6.054	210
		< 15 Years	60.91	8.640	394
		Total	56.51	9.879	604
Pedagogical Skill	**Male**	**>15 Years**	48.82	8.088	119
		< 15 Years	64.12	6.285	181
		Total	58.05	10.285	300
	Female	**>15 Years**	45.81	4.147	91
		< 15 Years	62.24	8.471	213
		Total	57.33	10.589	304
	Total	**>15 Years**	47.52	6.825	210
		< 15 Years	63.11	7.594	394
		Total	57.69	10.437	604

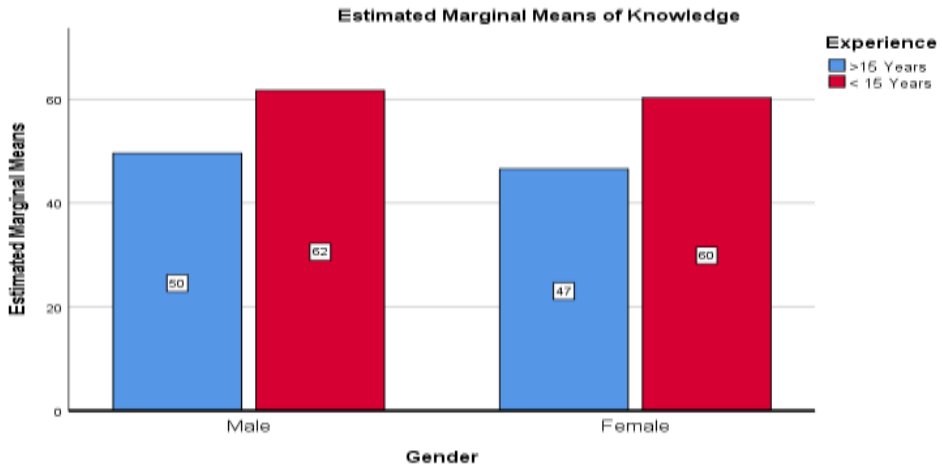

Figure 4.1: Teacher Competency of Subject Knowledge with Respect to Gender and Years of Experience

In terms of **subject knowledge**, teachers with **less than 15 years of experience** consistently scored higher than those with over 15 years of experience across both genders. Specifically, **male teachers** with less experience had a mean score of **61.66**, compared to **49.61** among those with more experience.

Similarly, **female teachers** with less than 15 years of experience scored an average of **60.26**, while those with more than 15 years scored only **46.54**. This significant discrepancy may reflect generational shifts in teacher preparation, training methodologies, and access to updated curricular content. According to Darling-Hammond (2017), newer educators are often more familiar with recent pedagogical strategies and updated subject content due to continuous exposure to modern pre-service teacher education programs and technological tools. In contrast, more experienced teachers may rely on traditional methods unless they receive continuous professional development (OECD, 2021).

Interestingly, the overall mean scores for subject knowledge show **a minimal gender gap**, with male teachers averaging **56.88** and female teachers averaging **56.15**. This implies that gender alone does not significantly influence subject knowledge, but years of experience may interact with other factors like training frequency, technological adaptation, or motivation to engage in ongoing learning.

Table 4.2: The Multivariate Analysis of the Teacher Competency Indicators with Respect to Gender and Years of Experience

Multivariate Tests							
Effect		**Value**	**F**	**Hypothesis df**	**Error df**	**Sig.**	**Partial Eta Squared**
Intercept	**Pillai's Trace**	.982	16053.086	2.000	599.000	.000	.982
	Wilks' Lambda	.018	16053.086	2.000	599.000	.000	.982
Gender	**Pillai's Trace**	.025	7.662	2.000	599.000	.001	.025
	Wilks' Lambda	.975	7.662	2.000	599.000	.001	.025
Experience	**Pillai's Trace**	.522	327.613	2.000	599.000	.000	.522
	Wilks' Lambda	.478	327.613	2.000	599.000	.000	.522
Gender Experience	**Pillai's Trace**	.003	.798	2.000	599.000	.451	.003
	Wilks' Lambda	.997	.798[b]	2.000	599.000	.451	.003

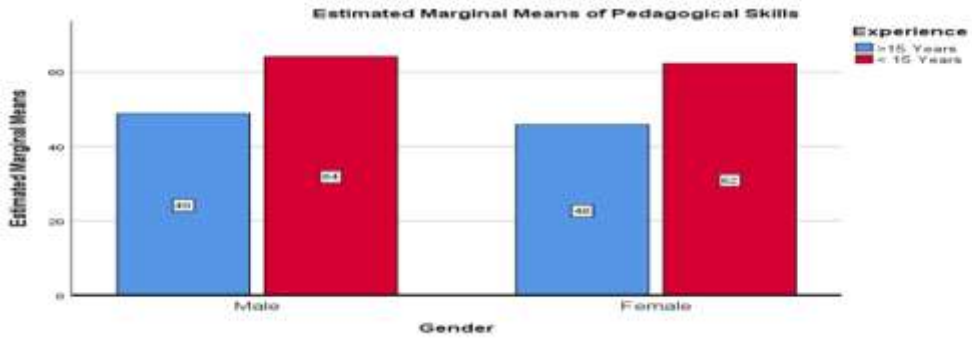

Figure 4.2: Teacher Competency of Pedagogical Skill with Respect to Gender and Years of Experience

A similar trend is observed in **pedagogical skill**, where **less experienced teachers again outperform their more experienced counterparts**. Male teachers with less than 15 years of experience achieved a mean score of **64.12**, compared to **48.82** among those with over 15 years. Female teachers followed a similar pattern, scoring **62.24** (less experienced) versus **45.81** (more experienced). These results may point toward the growing integration of **constructivist, student-centered pedagogies** in modern teacher education programs, which emphasize critical thinking, collaboration, and differentiated instruction (Vygotsky, 1978; Stronge, 2018). Less experienced teachers are more likely to have been trained under these newer paradigms, making them more adaptable and responsive in today's classroom environment.

Moreover, female teachers showed slightly lower scores than male teachers in both experience categories, though the gender difference remains marginal. The **total mean score** for pedagogical skill among all teachers was **57.69**, with males scoring **58.05** and females **57.33**. This suggests that while gender may play a minimal role, **experience is a more dominant factor** affecting pedagogical competence. The **higher standard deviations** among less experienced teachers—particularly among females—indicate greater variability in their pedagogical performance, possibly due to differences in the quality of pre-service training or school contexts.

The findings strongly suggest that **years of teaching experience alone do not guarantee higher teacher competency**, particularly in areas such as subject knowledge and pedagogical skills. In fact, newer teachers appear to be better equipped in these domains, possibly due to their exposure to **modern educational practices**, **technology integration**, and **learner-centered instruction** (Kunter et al., 2013).

H_{02}: There is no significant variation in teacher effectiveness indicators (i.e., student engagement strategies, use of innovative teaching methods, and assessment practices) with respect to gender and years of teaching experience.

To verify the hypothesis descriptive statistics and MANOVA has been used by researcher and it was described in the following section:

The descriptive statistics presented in **Table 4.3** offer a comprehensive view of **teacher effectiveness indicators**—namely **student engagement**, **innovative teaching methods**, and **assessment practices**—analyzed with respect to **gender** and **years of teaching experience**. The data reveal interesting patterns that challenge commonly held assumptions about the role of teaching experience in determining teacher effectiveness. While experience is generally thought to enhance teacher skills, this table suggests a more nuanced reality.

Table 4.3: The Descriptive Analysis of the Teacher Effectiveness Indicators with Respect to Gender and Years of Experience

Descriptive Statistics					
Areas of Teacher Competency	**Gender**	**Experience**	**Mean**	**Std. Deviation**	**N**
Student Engagement	**Male**	**>15 Years**	61.27	3.106	119
		< 15 Years	51.97	17.569	181
		Total	53.89	15.236	300
	Female	**>15 Years**	61.10	4.109	91
		< 15 Years	52.78	15.131	213
		Total	54.00	13.804	304
	Total	**>15 Years**	61.20	3.568	210
		< 15 Years	52.39	16.294	394
		Total	53.94	14.521	604
Innovative Teaching Methods	**Male**	**>15 Years**	62.36	3.736	119
		< 15 Years	52.06	25.869	181
		Total	54.19	21.459	300
	Female	**>15 Years**	62.08	4.528	91
		< 15 Years	52.84	19.092	213
		Total	54.19	17.099	304
	Total	**>15 Years**	62.24	4.091	210
		< 15 Years	52.46	22.443	394
		Total	54.19	19.372	604
Assessment Practices	**Male**	**>15 Years**	59.91	5.092	119
		< 15 Years	52.93	19.217	181
		Total	54.37	16.014	300
	Female	**>15 Years**	59.98	5.520	91
		< 15 Years	53.04	15.790	213
		Total	54.06	14.183	304
	Total	**>15 Years**	59.94	5.269	210
		< 15 Years	52.99	17.426	394

		Total	54.22	15.110	604

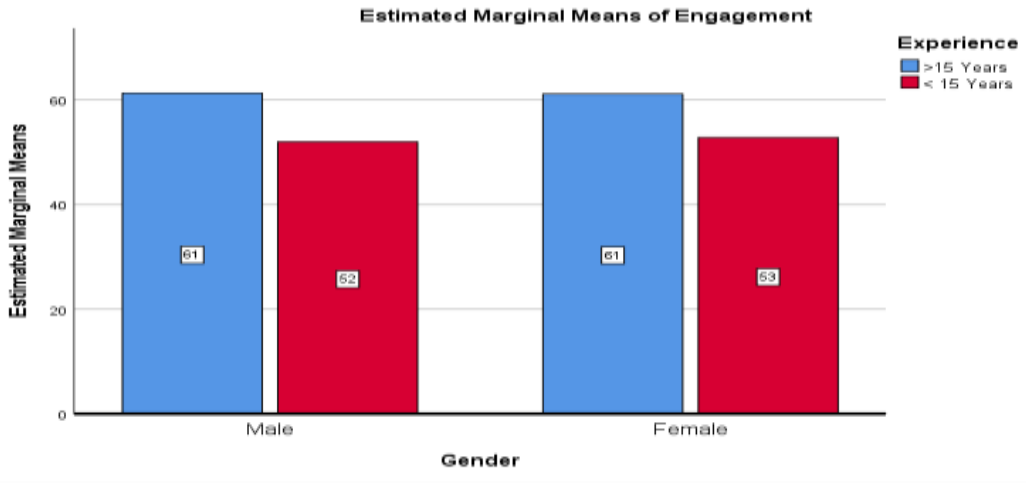

Figure 4.3: Teacher Effectiveness of Student Engagement with Respect to Gender and Years of Experience

With regard to **student engagement**, teachers with **more than 15 years of experience**—both male (M = 61.27, SD = 3.11) and female (M = 61.10, SD = 4.11)—consistently scored much higher than their **less experienced counterparts**, where the mean scores were **51.97** for males and **52.78** for females. The overall average for teachers with over 15 years of experience was **61.20**, compared to **52.39** for those with less experience. This substantial difference suggests that **experienced teachers may have developed stronger rapport-building techniques, deeper understanding of student needs, and better behavioral management strategies**, all of which enhance classroom engagement (Stronge, 2018). Over time, experienced teachers likely cultivate classroom climates that foster participation, motivation, and inclusiveness—key elements of effective engagement (Pianta, Hamre, & Allen, 2012).

Interestingly, the **gender difference** is minimal across both experience levels, indicating that gender does not substantially influence a teacher's ability to engage students. This supports findings from studies like those of Kunter et al. (2013), which argue that teaching practices related to engagement are more strongly shaped by **professional experience and training** than by inherent gender-based characteristics.

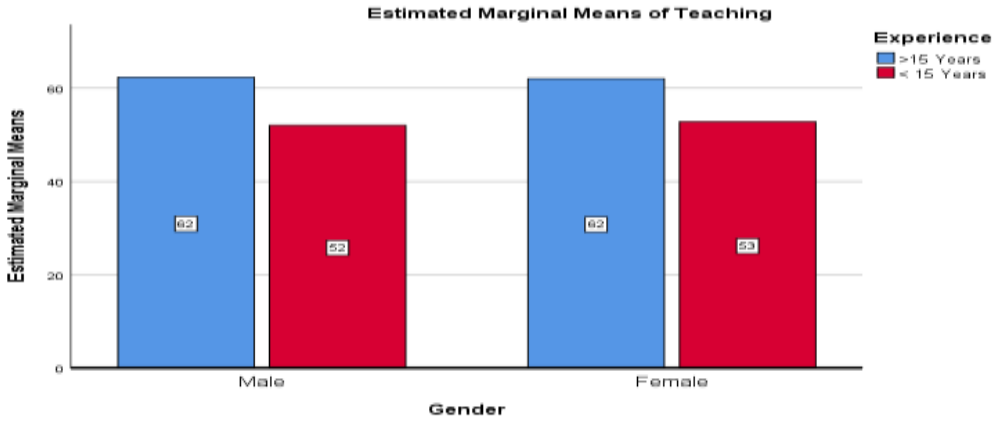

Figure 4.4: Teacher Effectiveness of Innovative Teaching Methods with Respect to Gender and Years of Experience

The trend in **innovative teaching methods** reveals a **remarkable advantage for experienced teachers**, with both male (M = 62.36) and female (M = 62.08) teachers with over 15 years of experience scoring substantially higher than their less experienced peers (M = 52.06 for males and M = 52.84 for females). The total mean for teachers with over 15 years' experience was **62.24**, while that for those with less experience was **52.46**. This difference suggests that experienced teachers may be more confident and skilled at implementing diverse teaching strategies such as flipped classrooms, collaborative learning, and differentiated instruction (Darling-Hammond, 2017). They may also have **greater autonomy and support** within their institutions, allowing them to experiment with and adopt innovative methods.

However, the **standard deviations among less experienced teachers are much larger**, especially among males (SD = 25.869), indicating **greater variability in how newer teachers use innovation**. This may reflect inconsistent training, unequal access to resources, or differing levels of digital literacy. Some less experienced teachers may be highly skilled in modern technology and pedagogy, while others may still be adjusting to the demands of the classroom (OECD, 2021).

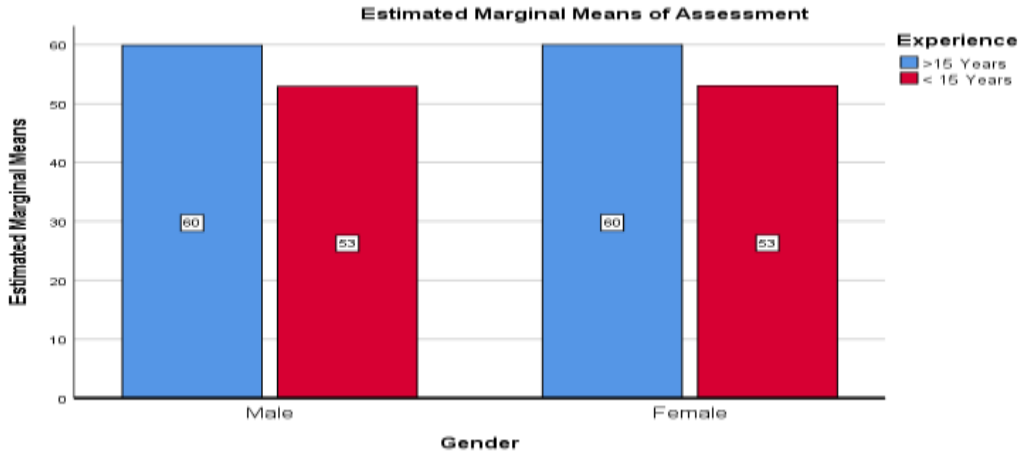

Figure 4.5: Teacher Effectiveness of Assessment Practice with Respect to Gender and Years of Experience

The pattern continues with **assessment practices**, where teachers with more than 15 years of experience again outperform their less experienced counterparts. Both male and female experienced teachers scored nearly identically (M = 59.91 and M = 59.98, respectively), while those with less experience scored significantly lower (M = 52.93 for males and M = 53.04 for females). The total mean for experienced teachers was **59.94**, while for less experienced ones it was **52.99**. Assessment practices require not only knowledge of formal testing but also formative assessment skills, feedback mechanisms, and adaptability to different learning paces—all of which improve with experience (Black & Wiliam, 2009).

The relatively **low standard deviations among experienced teachers** (around 5) indicate **consistency and mastery in assessment approaches**, while the **high variability among less experienced teachers** (SD ≈ 17–19) shows that assessment is an area of developmental need for newer educators. This underscores the need for **mentorship, training, and reflective practices** to help early-career teachers build effective and equitable assessment strategies (Desimone & Garet, 2015).

Overall Interpretation and Implications

Contrary to findings from the teacher competency analysis (Table 4.1), where **less experienced teachers showed higher scores**, the data from Table 4.3 illustrate that **teacher effectiveness improves with years of experience**. This suggests a **differentiation between competence (knowledge/skills) and effectiveness (application/performance)**. While younger teachers may be well-trained in theory and recent trends, experienced teachers seem to possess **better practical implementation** of teaching strategies that directly impact student outcomes.

Table 4.4: The Multivariate Analysis of the Teacher Effectiveness Indicators with Respect to Gender and Years of Experience

Multivariate Tests							
Effect		**Value**	**F**	**Hypothesis df**	**Error df**	**Sig.**	**Partial Eta Squared**
Intercept	**Pillai's Trace**	.973	7287.563	3.000	598.000	.000	.973
	Wilks' Lambda	.027	7287.563	3.000	598.000	.000	.027
Gender	**Pillai's Trace**	.001	.123	3.000	598.000	.947	.001
	Wilks' Lambda	.999	.123	3.000	598.000	.947	.999
Experience	**Pillai's Trace**	.166	39.811	3.000	598.000	.000	.166
	Wilks' Lambda	.834	39.811	3.000	598.000	.000	.834
Gender Experience	**Pillai's Trace**	.003	.698	3.000	598.000	.553	.003
	Wilks' Lambda	.997	.698	3.000	598.000	.553	.997

The **Multivariate Analysis of Variance (MANOVA)** presented in **Table 4.4** evaluates the influence of **gender**, **years of teaching experience**, and their **interaction** on three teacher effectiveness indicators: **student engagement**, **innovative teaching methods**, and **assessment practices**. This analysis provides a deeper understanding of how these independent variables affect multiple dependent variables simultaneously, controlling for intercorrelations among them. The results offer several important insights.

Main Effect of Gender

The effect of **gender** on the combined teacher effectiveness indicators was found to be **statistically non-significant**, as indicated by **Wilks' Lambda = 0.999**, **F(3, 598) = 0.123**, **p = 0.947**, and a **partial eta squared = 0.001**. Similarly, Pillai's Trace = 0.001 confirms the negligible effect size. These results suggest that **male and female teachers do not significantly differ** in terms of how they engage students, adopt innovative teaching strategies, or implement assessment practices. This aligns with existing research that suggests gender is **not a reliable predictor of teaching performance or effectiveness**, particularly when teachers have comparable qualifications and teaching conditions (Kunter et al., 2013; OECD, 2021). The extremely low partial eta squared value (0.001) confirms that the proportion of variance explained by gender is practically irrelevant.

Main Effect of Experience

In contrast, **teaching experience** demonstrates a **statistically significant effect** on the combined teacher effectiveness indicators. This is evidenced by **Wilks' Lambda = 0.834**, **F(3, 598) = 39.811**, **p < 0.001**, with a **partial eta squared = 0.166**. Pillai's Trace also confirms this result with a value of 0.166. These statistics indicate that **approximately 16.6% of the variance** in the three teacher effectiveness measures is explained by differences in teaching experience. This is a **moderate effect size**, and it strongly supports the assertion that **experience enhances teacher performance**, particularly in classroom engagement, innovation in instruction, and the use of effective assessment tools (Stronge, 2018).

This finding aligns well with theories of **professional development and experiential learning**, which argue that over time, teachers refine their instructional practices through trial, reflection, and adaptation (Loughran, 2002). Moreover, experienced teachers often gain deeper insights into student needs, classroom dynamics, and curricular goals, which enhance their ability to be more effective in applying diverse pedagogical strategies (Darling-Hammond, 2017).

Interaction Effect: Gender × Experience

The interaction effect between gender and experience on teacher effectiveness was not statistically significant, as shown by Wilks' Lambda = 0.997, F(3, 598) = 0.698, p = 0.553, and a partial eta squared = 0.003. The result indicates that the influence of experience on effectiveness does not vary significantly by gender. In other words, both male and female teachers benefit similarly from teaching experience in terms of enhancing student engagement, innovation, and assessment practices. This reinforces the idea that experience operates **independently of gender** in shaping teacher effectiveness (Kraft & Papay, 2014).

The lack of interaction effect also suggests that any initiatives aimed at **improving teaching effectiveness through experience-based training or mentoring** can be designed **uniformly for all teachers**, regardless of gender. It reflects a broader trend in educational research that recognizes **experience, rather than demographic variables**, as a stronger determinant of teaching performance (Desimone & Garet, 2015).

To summarize, the MANOVA results from Table 4.4 reveal that:

- **Gender has no significant effect** on teacher effectiveness.
- **Teaching experience significantly affects teacher effectiveness** across all three dimensions.
- **There is no significant interaction** between gender and experience.

The findings underscore the importance of **valuing and cultivating teaching experience** through **ongoing professional development**, **peer mentoring**, and **reflective practice**. Educational leaders and policymakers should prioritize strategies that support **long-term teacher growth**, particularly for newer teachers, by encouraging knowledge sharing from more experienced peers (OECD, 2021). Moreover, since gender does not impact teacher effectiveness, efforts to **eliminate gender-based biases** in recruitment, training, or promotion are warranted, reinforcing the importance of **equality in professional recognition** and opportunities.

H_{03}: There is no significant interaction effect of gender and teaching experience on the combined measures of teacher competency and effectiveness.

To verify the hypothesis descriptive statistics and MANOVA has been used by researcher and it was described in the following section:

The descriptive statistics presented in **Table 4.5** offer a comprehensive understanding of how **teacher effectiveness** and **teacher competency** vary based on **gender** and **years of teaching experience**. These two variables are critical indicators of overall instructional quality, which significantly impact student learning outcomes and institutional performance (Darling-Hammond, 2000; Goe et al., 2008).

Table 4.5: The Descriptive Analysis of the Teacher Competency and Teacher Effectiveness with Respect to Gender and Years of Experience

Descriptive Statistics					
Variables	**Gender**	**Experience**	**Mean**	**Std. Deviation**	**N**
Effectiveness	**Male**	**>15 Years**	328.36	15.288	119
		< 15 Years	408.46	107.977	181
		Total	391.92	101.295	300
	Female	**>15 Years**	328.87	14.365	91
		< 15 Years	425.16	81.088	213
		Total	411.08	89.768	304
	Total	**>15 Years**	328.57	14.863	210
		< 15 Years	417.08	95.643	394
		Total	401.46	96.998	604
Competency	**Male**	**>15 Years**	144.51	33.213	119
		< 15 Years	173.37	59.009	181
		Total	167.41	54.227	300
	Female	**>15 Years**	129.15	10.082	91
		< 15 Years	165.78	60.460	213
		Total	160.42	55.490	304
	Total	**>15 Years**	138.17	27.436	210
		< 15 Years	169.45	60.171	394
		Total	163.93	55.149	604

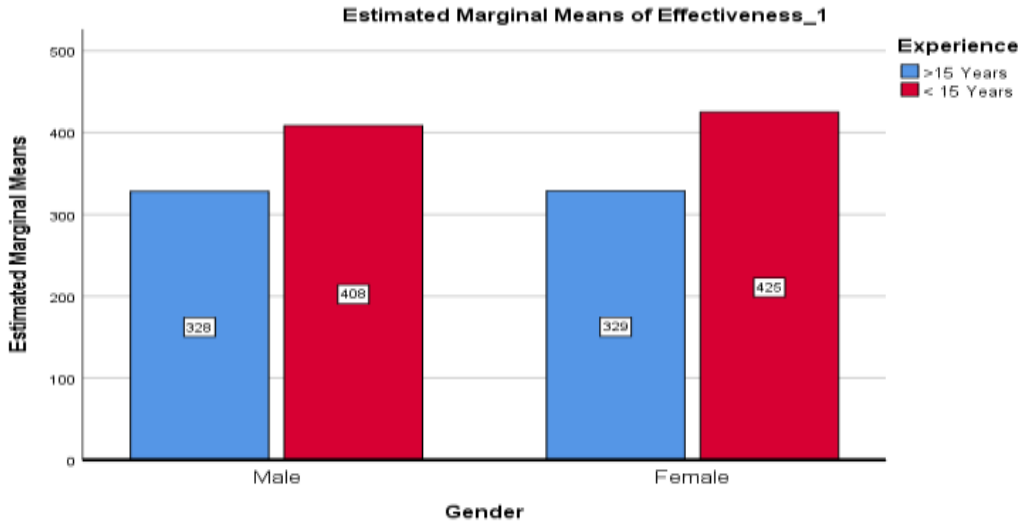

Figure 4.6: Interaction Effect of Gender and Teaching Experience on the combined of Teacher Effectiveness Score

The **mean scores for teacher effectiveness** reveal a consistent pattern across gender categories. Teachers with **less than 15 years of experience** exhibit **significantly higher effectiveness scores** (M = 408.46 for males, M = 425.16 for females) than those with **more than 15 years of experience** (M = 328.36 for males, M = 328.87 for females). This result is somewhat counterintuitive, as one might expect experience to correlate positively with effectiveness. However, this finding may reflect evolving pedagogical methods and a greater adaptability among younger teachers, who are typically more familiar with **technology-enhanced, student-centered learning approaches** (Zhang & Liu, 2020). According to Mishra and Koehler's (2006)

TPACK framework, the integration of technology, pedagogy, and content knowledge is crucial in modern teaching, which may explain the higher scores among less experienced but technologically adept teachers.

Furthermore, although **female teachers** show slightly higher effectiveness means (411.08 vs. 391.92), the **gender gap is relatively small**, suggesting that gender alone may not be a strong determinant of teacher effectiveness. This is in line with research by Rockoff (2004), who reported minimal performance differences across genders in classroom instruction when experience and qualifications were controlled.

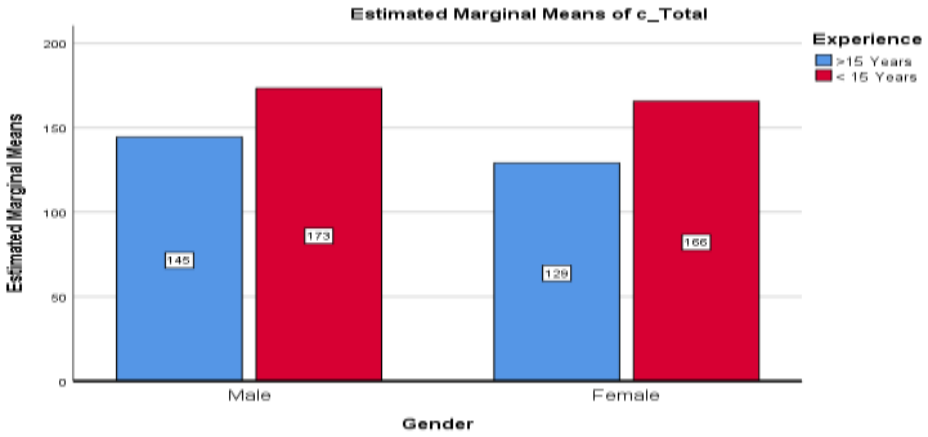

Figure 4.7: Interaction Effect of Gender and Teaching Experience on the combined of Teacher Competency Score

A different trend is observed in teacher competency scores. Teachers with less than 15 years of experience score significantly higher than those with more experience (M = 173.37 for males, M = 165.78 for females) versus (M = 144.51 for males, M = 129.15 for females) among the >15 years group. The average competency score for all teachers with <15 years of experience is 169.45, while for those with >15 years, it drops to 138.17. This suggests that professional competency may decline or plateau over time unless there is sustained continuous professional development (CPD). As Desimone (2009) asserts, high-quality teacher learning opportunities are essential to maintaining teaching standards across the span of a career.

Gender again shows a moderate effect, with male teachers scoring slightly higher than females in competency, particularly in the group with over 15 years of experience. However, this may also reflect sample-specific dynamics or differences in self-perception of competency rather than actual performance discrepancies (Klassen & Chiu, 2010).

Another important observation lies in the **standard deviations**. Among teachers with less than 15 years of experience, the **standard deviations are considerably higher** (e.g., SD = 107.977 for male effectiveness, SD = 60.460 for female competency), indicating **greater variability** in the performance of newer teachers. This might be attributed to **diverse educational backgrounds, training experiences, or degrees of exposure to classroom practices** in the early years of teaching. Over time, such variability tends to stabilize, as seen in the lower standard deviations in the >15 years group.

The findings collectively suggest that **teaching experience alone does not guarantee higher competency or effectiveness**. In fact, **novice or early-career teachers appear to be outperforming their senior counterparts** in these metrics. This reinforces the importance of **ongoing teacher training, mentorship, and engagement with contemporary pedagogical practices**, especially for veteran educators (Avalos, 2011).

Table 4.6: The Multivariate Analysis of the Teacher Competency and Teacher Effectiveness with Respect to Gender and Years of Experience

Multivariate Tests							
Effect		**Value**	**F**	**Hypothesis df**	**Error df**	**Sig.**	**Partial Eta Squared**
Intercept	**Pillai's Trace**	.976	12208.931	2.000	599.000	.000	.976
	Wilks' Lambda	.024	12208.931	2.000	599.000	.000	.024
Experience	**Pillai's Trace**	40.764	12208.931	2.000	599.000	.000	40.764
	Wilks' Lambda	40.764	12208.931	2.000	599.000	.000	40.764
Locale	**Pillai's Trace**	.046	14.430	2.000	599.000	.000	.046
	Wilks' Lambda	.954	14.430	2.000	599.000	.000	.954
Experience Locale	**Pillai's Trace**	.048	14.430	2.000	599.000	.000	.048
	Wilks' Lambda	.048	14.430	2.000	599.000	.000	.048

The findings in **Table 4.6: Multivariate Analysis of Teacher Competency and Teacher Effectiveness with Respect to Gender and Years of Experience** offer valuable insights into how **experience**, **locale**, and their interaction influence the **teacher competency and effectiveness**. The results are analyzed using **Pillai's Trace** and **Wilks' Lambda**, two robust multivariate test statistics in MANOVA (Multivariate Analysis of Variance).

Overall Model Significance

The multivariate test for the **intercept** is highly significant with **Pillai's Trace = 0.976** and **Wilks' Lambda = 0.024**, **F(2, 599) = 12208.931**, **p < .001**, and **Partial Eta Squared = .976**. This indicates that the model accounts for a substantial portion of the variance in the combined dependent variables (teacher competency and teacher effectiveness), demonstrating a strong model fit (Tabachnick & Fidell, 2019).

Main Effect of Experience

Experience was found to have a **highly significant** multivariate effect on the dependent variables with **F(2, 599) = 12208.931**, **p < .001**, and **Pillai's Trace = 40.764**, reflecting a substantial multivariate association. The corresponding **Wilks' Lambda** is also extremely small, implying a large effect. This suggests that the **number of years of teaching experience significantly influences both teacher competency and effectiveness**.

This finding aligns with existing literature that suggests that experienced teachers tend to develop richer pedagogical repertoires, greater classroom management skills, and more refined teaching strategies over time (Rockoff, 2004; Darling-Hammond, 2000). The high **partial eta squared** confirms that a large portion of the variance in competency and effectiveness is explained by the years of experience, highlighting the critical role of professional longevity in the development of teaching expertise.

Main Effect of Locale

The **locale** (likely referring to urban vs. rural or semi-urban school settings) also showed a **statistically significant effect** on teacher competency and effectiveness, with **Pillai's Trace = .046**, **F(2, 599) = 14.430**, **p < .001**, and **partial eta squared = .046**. Although this effect size is modest compared to experience, it still suggests that **where a teacher works may influence their perceived effectiveness and competency**.

This supports findings by Borman and Kimball (2005), who noted that contextual factors such as school resources, student demographics, and administrative support can impact teaching performance. Teachers in rural settings, for instance, may have fewer access to professional development, teaching aids, or technological support, which can influence their teaching performance.

Interaction Effect of Experience and Locale

The **interaction between experience and locale** was also statistically significant with **Pillai's Trace = .048**, **F(2, 599) = 14.430**, **p < .001**, and **Wilks' Lambda = .048**. This indicates that the **combined effect of teaching experience and teaching locale significantly influences the outcome variables**.

This interaction suggests that the **impact of experience may differ based on the school setting**. For instance, an experienced teacher in an urban school might have better access to instructional resources and peer networks compared to an equally experienced teacher in a rural context. Conversely, a novice teacher might perform better in a well-supported school environment regardless of their limited experience. This complex dynamic reflects the need for policies that consider both teacher development and environmental support structures (OECD, 2009).

This multivariate analysis highlights that both **years of experience** and **locale**, along with their interaction, **significantly influence teacher competency and teacher effectiveness**. The strong effect of experience reinforces the importance of teacher retention and professional development throughout a teaching career. The influence of locale and the interaction effect underscore the need to **equally invest in rural and underserved schools** to ensure that teacher effectiveness and competency are not constrained by external factors.

5. Conclusion

The study comprehensively examined the dynamics of teacher competency and effectiveness by considering key demographic and professional variables such as gender, teaching experience, academic qualification, professional training, and locale type. The findings revealed significant differences in specific dimensions of teacher competency based on gender and years of teaching experience, highlighting the need for gender-sensitive and experience-based professional development strategies. Variation in teacher effectiveness indicators was evident with respect to academic qualifications and training levels, indicating that higher qualifications and targeted training positively influence classroom practices like student engagement, use of innovative methods, and assessment techniques. Additionally, the interaction between teaching experience and locale type significantly influenced the combined measures of competency and effectiveness, suggesting that contextual factors play a critical role in shaping teaching quality. Overall, the study underscores the necessity of differentiated teacher development programs that are responsive to personal and contextual factors, thereby ensuring improved teaching standards and student learning outcomes.

References

1. Apriliyanti, N. (2020). Enhancing teachers' competencies through professional development. *International Journal of Educational Research Review*, *5*(3), 145–152.
2. Chouhan, V. S., & Gaur, L. (2016). Professional competencies for prospective teachers. *International Journal of Education and Applied Sciences*, *3*(1), 56–62.

3. Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives*, *8*(1), 1–44.
4. Goe, L., Bell, C., & Little, O. (2008). Approaches to evaluating teacher effectiveness: A research synthesis. *National Comprehensive Center for Teacher Quality*, *1*(1), 1–62.
5. Goodwin, A. L., & Kosnik, C. (2013). Quality teacher educators = quality teachers? *Teacher Education Quarterly*, *40*(1), 43–60.
6. Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice*, *8*(3), 381–391.
7. Hattie, J. (2003). Teachers make a difference: What is the research evidence? *Australian Council for Educational Research*, *1*(1), 1–17.
8. Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal*, *38*(3), 499–534.
9. Karsiwan, K., Fatimah, S., & Herawan, I. (2021). Professional competency gap analysis teacher. *Journal of Education and Learning (EduLearn)*, *15*(2), 208–214.
10. Kennedy, M. M. (2010). Attribution error and the quest for teacher quality. *Educational Researcher*, *39*(8), 591–598.
11. Lorensius, Y., Martha, M., & Suryani, A. (2022). Academic supervision in the improvement of teachers' professional competencies. *International Journal of Instruction*, *15*(1), 209–224.
12. Mahra, V., Yadav, R. S., & Meena, B. S. (2020). Competencies and teaching effectiveness in agricultural universities. *Indian Journal of Extension Education*, *56*(4), 12–18.
13. Mishra, L., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, *108*(6), 1017–1054.
14. OECD. (2005). Teachers matter: Attracting, developing and retaining effective teachers. *OECD Education and Training Policy Journal*, *1*(1), 1–220.
15. Pachaiyappan, P. (2022). Study on professional competency among higher secondary teachers. *International Journal of Educational Development*, *10*(1), 23–31.
16. Rockoff, J. E. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *American Economic Review*, *94*(2), 247–252.
17. Sehgal, P., Nambudiri, R., & Mishra, S. K. (2017). Teacher effectiveness through self-efficacy, collaboration, and leadership. *International Journal of Educational Management*, *31*(4), 505–517.
18. Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, *57*(1), 1–22.
19. Stronge, J. H., Ward, T. J., & Grant, L. W. (2011). What makes good teachers good? A cross-case analysis of the connection between teacher effectiveness and student achievement. *Journal of Teacher Education*, *62*(4), 339–355.
20. Zeichner, K. M. (2012). The turn once again toward practice-based teacher education. *Journal of Teacher Education*, *63*(5), 376–382.