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Original Article

Impact of Cognitive Skills and other Demographics of Teachers on their Performance in Public and Private Schools of Karachi

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ABSTRACT

Background: The performance of teachers in educational settings is a critical factor for effective learning. Recent studies have highlighted the significance of cognitive abilities, gender, education level, and other personal competencies in influencing teacher performance. However, there is limited research exploring these aspects in the context of Karachi's public and private schools.

Objective: This study aimed to investigate the impact of cognitive skills and demographic factors such as gender and education level on the performance of teachers in Karachi.

Methods: A quantitative research approach was adopted, utilizing a descriptive and correlational design. The population comprised teachers from both public and private sectors in Karachi, Pakistan. A sample of 250 teachers was selected through a simple random sampling method. Data were collected using standardized instruments, including Peter Honey's Critical Thinking Questionnaire and the Critical Thinking Disposition Inventory for cognitive ability, and the Evaluation of Teaching Performance Questionnaire for teacher performance. Statistical analysis was conducted using SPSS version 25, employing tests such as Independent Sample t-Test, One-way ANOVA, Two-way ANOVA, and Linear Regression.

Results: The study found that male teachers had a slightly higher mean cognitive ability score ($M = 20.069$, $SD = 3.675$) than female teachers ($M = 19.531$, $SD = 3.816$), but this difference was not statistically significant ($t(248) = 0.948$, $p = 0.344$). Similarly, no significant difference in teacher performance was observed between genders ($t(241) = 0.533$, $p = 0.595$). The factorial ANOVA indicated no significant effect of gender or education level on teacher performance ($F(3, 234) = 0.190$, $p = 0.903$). Additionally, no significant differences in teacher performance were found across different educational qualifications ($F(3, 238) = 1.777$, $p = 0.152$). However, a significant positive correlation between cognitive ability and teacher performance was identified ($r = 0.575$, $p < 0.001$).

Conclusion: The study concludes that while gender and education level do not significantly impact teacher performance, cognitive abilities play a crucial role. This highlights the importance of focusing on cognitive skill development in teacher training programs.

Keywords: Teacher Performance, Cognitive Skills, Gender, Education Level, Karachi Schools, Quantitative Research.

INTRODUCTION

The study investigates the complex interplay between cognitive skills, demographic factors, and their impact on teacher performance in Karachi's public and private schools. Cognitive skills, integral to the process of thinking and information assimilation, encompass awareness, feelings, and the ability to process experiences (1). These skills are influenced by various external factors such as the educational framework, teaching methods, assessment types, teacher feedback, emotional climate, and positivity (1). The importance of cognitive abilities in teacher selection processes is widely recognized (2) highlighting the need to understand their relationship with teacher effectiveness. Studies suggest a correlation between higher creative and critical thinking abilities and enhanced cognitive learning outcomes (3, 4). Creative thinking skills, in particular, have been linked to better cognitive learning outcomes and are essential in fostering quality and sustainable innovation (5, 6).

The topic of gender differences in cognitive abilities remains a subject of intense debate among social scientists, the general public, and the media, with various studies and theoretical perspectives contributing to this discourse (7). The performance of teachers, a

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critical element in both effective teaching and quality learning, has been shown to vary with gender. For instance, the female teachers were more effective when teaching students of the same gender (8). However, the studies indicate no significant gender disparity in teaching proficiency or the impact of teacher gender on student academic success (9).

Research exploring the connection between gender and critical thinking has yielded mixed results. Some studies found gender to be a significant differentiator in creative capacity and critical thinking skills, while others reported no significant gender impact (10). It appears that gender differences in critical thinking ability are more pronounced at higher levels of critical thinking but not at moderate or low levels. These findings align with research suggesting that critical thinking can be enhanced through experience and knowledge dissemination (11-13).

The quality of teaching and learning is heavily influenced by the qualifications and motivation of teachers. High levels of proficiency and qualification in teachers can elevate educational standards (3, 7, 14, 15). These qualifications play a pivotal role in maintaining the integrity of the teaching profession, protecting the public from unprofessional educational practices, and safeguarding educational providers from deviating from relevant standards (4, 16).

However, the research community notes a gap in understanding the direct impact of critical thinking on teacher performance. While critical thinking skills are crucial for evaluating student progress, it's unclear how these skills influence teacher performance (9, 17). This study aims to bridge this gap by examining the relationship between cognitive skills, demographic factors like gender and qualification levels, and their effect on teacher performance. It posits that critical thinking and holistic education, which involve pursuing intrinsic self-development, are key to this relationship. The study will provide a conceptual foundation for integrating these elements into school curricula and addressing psychological aspects of life, thereby contributing to the discourse on cognitive education and its impact on problem-solving skills, disciplinary knowledge acquisition, and professional success of teachers (8, 18, 19).

MATERIAL AND METHODS

The methodology of this study encompassed a quantitative research design, employing a descriptive and correlational approach to examine the relationships between cognitive abilities, demographic factors, and teacher performance in public and private schools in Karachi, Pakistan. The study's independent variables included cognitive ability and demographic characteristics, specifically gender and level of qualification. The dependent variable was defined as teacher performance (2, 20, 21).

The population of interest comprised all teachers from both public and private sectors in Karachi. A probability sampling technique was utilized, with the sample method being a simple random sample. This approach was chosen to ensure that each member of the targeted population had an equal chance of being included in the study, thereby enhancing the representativeness and generalizability of the findings. A total of 250 teachers were included in the final sample (22, 23).

Data collection was conducted through the distribution of questionnaires to the teachers. These questionnaires were carefully designed to measure the defined variables accurately. For measuring cognitive ability, two instruments were employed: Peter Honey's Critical Thinking Questionnaire and the Critical Thinking Disposition Inventory (CTDI) (24, 25). These tools have been previously used in research by Tuyen Son Nguyen and Huan Buu Nguyen at Can Tho University, Vietnam, as well as by Prof. Dr. Mona H. Soliman and Dr. Mamdouh Farag. To assess teacher performance, the Evaluation of Teaching Performance Questionnaire (CEID) from the Centro de Estudios e Investigaciones Docentes, and the Staff Performance Questionnaire revised by the University of Fraser Valley in August 2011 were utilized (4, 10, 15, 16).

The data analysis was performed using SPSS version 25. This software facilitated a comprehensive analysis of the collected data, including the application of statistical techniques such as the Independent Sample t-Test, One-way ANOVA, Two-way ANOVA, and Linear Regression. These methods were selected to test various hypotheses regarding the relationships between gender, level of qualification, cognitive ability, and teacher performance. The graphical representation of data was also incorporated to enhance the clarity and understanding of the findings (13, 21, 22, 26).

Ethical considerations were rigorously adhered to throughout the study. Participants were informed about the purpose of the research, and their consent was obtained prior to data collection. Confidentiality and anonymity of the participants were maintained to ensure the ethical integrity of the study and the protection of participant data.

RESULTS

The results of the study reveal insightful findings regarding the cognitive abilities and performance of teachers in Karachi's public and private schools. In assessing cognitive abilities by gender, the study found a slight difference in mean scores between male and female teachers. Male teachers exhibited a mean cognitive ability score of 20.069 (SD = 3.675, SEM = 0.483), marginally higher than

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their female counterparts, who had a mean score of 19.531 (SD = 3.816, SEM = 0.275). However, this difference was not statistically significant, as indicated by the t-test results [t(248) = 0.948, p = 0.344] (Table 1).

Similarly, when examining teacher performance by gender, the results showed that male teachers had a slightly higher mean performance score of 44.536 (SD = 8.575, SEM = 1.146), compared to female teachers who scored 43.877 on average (SD = 7.979, SEM = 0.583). Again, this difference did not reach statistical significance [t(241) = 0.533, p = 0.595] (Table 2), suggesting that gender does not play a crucial role in determining teacher performance.

Table 1 Cognitive Ability by Gender

Gender	N	Mean	Std. Deviation	Std. Error Mean
Male	58	20.069	3.675	0.483
Female	192	19.531	3.816	0.275
Statistical Test	t(248)	0.948	p-value	0.344

Table 2 Teacher Performance by Gender

Gender	N	Mean	Std. Deviation	Std. Error Mean
Male	56	44.536	8.575	1.146
Female	187	43.877	7.979	0.583
Statistical Test	t(241)	0.533	p-value	0.595

Further analysis was conducted to understand the impact of both gender and education level on teacher performance. The study employed a factorial ANOVA, considering gender and education level as factors. It was found that neither gender [F(1, 234) = 0.131, p = 0.718] nor education level [F(3, 234) = 1.609, p = 0.188], nor the interaction between these two factors [F(3, 234) = 0.190, p = 0.903], significantly influenced teacher performance (Table 3). This indicates that other factors beyond gender and educational qualifications might be more influential in determining teacher performance.

Table 3 Teacher Performance by Gender and Education Level

Factor	F-value	df1	df2	p-value
Gender	0.131	1	234	0.718
Education	1.609	3	234	0.188
Gender * Education	0.190	3	234	0.903

Table 4 Teacher Performance by Level of Qualification

Education Level	N	Mean	Std. Deviation	Std. Error
Diploma	4	50.750	3.500	1.750
Undergraduate	16	44.750	8.606	2.152
Graduate	113	44.487	8.197	0.771
Postgraduate	109	42.963	7.589	0.727
Statistical Test	F(3, 238)	1.777	p-value	0.152

Table 5 Correlation between Cognitive Ability and Teacher Performance

Variable	Mean	Std. Deviation	N
CT	19.593	3.602	243
TP	44.029	8.107	243
Correlation (r)	0.575	p < 0.001	F(1, 241)

When exploring teacher performance across different levels of educational qualifications, a one-way ANOVA was performed. The groups compared included teachers with diplomas, undergraduate degrees, graduate degrees, and postgraduate qualifications. The results indicated no significant difference in performance among these groups [F(3, 238) = 1.777, p = 0.152] (Table 4). This suggests that the level of formal education might not be a strong predictor of teacher performance.

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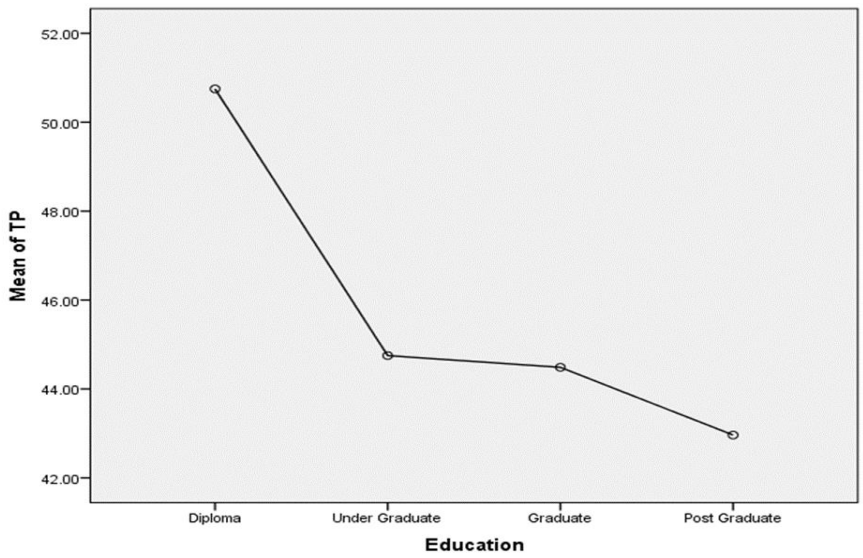

Figure 1 Education across programs

Finally, the study examined the relationship between cognitive ability and teacher performance using Pearson correlation. A significant positive correlation was found [$r = 0.575$, $p < 0.001$], and further regression analysis confirmed the strength of this relationship [$F(1, 241) = 119.296$, $p < 0.001$] (Table 5). This finding highlights the importance of cognitive abilities in enhancing teacher performance.

The study provides valuable insights into the factors influencing teacher performance in Karachi. While gender and education level did not show a significant impact, cognitive abilities emerged as a key determinant of performance, underscoring the need for cognitive skill development in teacher training programs.

DISCUSSION

The study conducted in Karachi provides a multifaceted understanding of the factors influencing teacher performance, integrating both new findings and insights from recent studies. In the Karachi study, gender and education level appeared to have limited impact on teacher performance and cognitive abilities. This aligns with Al-Momani (2022), who found no significant gender differences in cognitive competencies among secondary school teachers in Jordan (27). However, this contrasts with the findings of Suprawata & Riastini (2022), where female teachers exhibited better numeracy skills than their male counterparts, irrespective of their education level (28).

The Karachi study's revelation that cognitive ability is a key determinant of teacher performance resonates with Kaur & Prajapati (2022), who identified a positive correlation between academic success and cognitive ability among secondary school students (16). This underscores the importance of cognitive skills development in both student and teacher populations, highlighting that effective teaching and learning are deeply intertwined with cognitive competencies.

Interestingly, the Karachi study's indication that formal education level might not be a strong predictor of teacher performance echoes the findings of Arteaga-Cedeño et al. (2022) (26). They observed that professional qualifications primarily influenced certain socioemotional skills crucial for effective teaching, suggesting that teacher performance is a complex construct influenced by a variety of factors beyond academic qualifications.

Moreover, the recent research by Yudho et al. (2022), emphasizing the roles of emotional intelligence and self-confidence in teacher performance, adds another layer to our understanding (10). This aligns with the findings from Karachi, where other factors beyond gender and educational qualifications might be more influential in determining teacher performance. It highlights the need for a holistic approach in teacher training and development programs, focusing not only on academic qualifications but also on enhancing emotional intelligence, self-confidence, and specific competencies.

In constructing a comprehensive discussion, it is crucial to acknowledge the multifaceted nature of teacher performance. The Karachi study, alongside these recent findings, suggests that teacher performance is influenced by a complex interplay of cognitive abilities, socioemotional skills, and personal competencies. While cognitive abilities play a significant role, as evidenced by the positive correlation between cognitive ability and teacher performance in the Karachi study, other factors such as emotional intelligence, self-confidence, and specific skill sets like numeracy also contribute significantly.

The integration of these studies leads to an expanded understanding that effective teaching is not solely contingent on traditional metrics like gender or formal education. Instead, it is a more nuanced amalgamation of various skills and attributes. This holistic view should guide future teacher training and development programs, emphasizing the need for comprehensive skill development that goes beyond academic qualifications to include socioemotional skills, cognitive abilities, and personal competencies (19).

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CONCLUSION

The study conducted in Karachi, alongside recent research, leads to a pivotal conclusion: teacher performance is a multifaceted construct influenced not just by traditional factors like gender and education level, but significantly by cognitive abilities, emotional intelligence, and other personal competencies. This insight has profound implications for teacher training and development programs, underscoring the need for a holistic approach that fosters a broad spectrum of skills. Emphasizing cognitive skill enhancement, along with socioemotional and personal competencies, can more effectively prepare teachers to meet the diverse challenges of modern education and positively impact student learning outcomes.

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