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Teachers' Classroom Management Skills Influence the Academic Performance of Secondary School Science Students in Lahore

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ABSTRACT

This research analyses how teachers' management abilities in the classroom affect how well their students perform in academic science courses at secondary schools in the city of Lahore. This research utilized a quantitative, descriptive survey design methodology whereby 400 secondary school science teachers from 45 different public and private secondary schools within Lahore were surveyed. The survey consisted of a 37-item structured questionnaire measuring five different Classroom Management dimensions (Discipline Management, Teaching/Learning Organization, Classroom Interaction, Teacher/Student Communication, and Psychological/Social Classroom Environment). It also contained a measure of students perceived academic performance as well as the internal consistency of the questionnaire.Descriptive results indicated that most classroom management strategies used by teachers are used moderately, however teacher-student communication and classroom climate received higher scores compared to all other strategies. There was no significant difference in teacher management skills and student performance when comparing demographic variables such as gender and service status or the classification of the school sector in which the teachers work (public/private). Correlation Analysis indicated that there exists a positive correlation between student academic performance and the dimensions that measure teachers' use of classroom management strategies, specifically (structured teaching practices, lesson organization, and classroom interactions). Regression results supported the hypotheses that the dimensions of Classroom Management had a significant positive effect on predicted student performance; this indicates that organized teaching and providing quality instructional practices and implementing positive classroom interaction has a positive impact on student learning. In conclusion, the results of this study indicate the importance of effective classroom management practices in improving secondary level Science Students' Academic Performance and highlight the need for greater emphasis on structured Classroom Management Training for Teachers.

Keywords: *Classroom Management, Academic Performance, Teacher-Student communication*

INTRODUCTION

Teaching has long been concerned with how teachers' management skills influence student learning, especially as educational environments evolve and demand effective practices that improve learning outcomes. This study examines how teachers' classroom management abilities relate to the scientific performance of secondary school students in Lahore, a city rich in educational activity where teaching practices strongly shape academic achievement. Classroom management, defined as the planning and orchestration of classroom variables including physical layout, policies, and instructional strategies, plays a pivotal role in creating a conducive learning environment (Korpershoek et al., 2014). Research consistently shows that teachers' actions and management skills impact student achievement more than curriculum or assessment factors (Marzano et al., 2003). Effective classroom management extends beyond control and discipline; it includes fostering academic interest, cooperation, and addressing students' diverse behavioral and learning needs, which supports both cognitive and socio-emotional

development (Everston & Weinstein, 2006). A well-managed classroom contributes to a calm atmosphere that enhances participation, critical thinking, and engagement, enabling students to learn with confidence and motivation (Aliakbari & Bozargmanish, 2015). Verbal instruction and consistent expectations further serve as strong tools for guiding student behavior and improving academic outcomes (Good, 2004). Teachers' perspectives on these practices are essential, as classroom management remains one of the most challenging yet critical aspects of teaching (Huntly, 2008). An inclusive, supportive, and stimulating environment not only nurtures learning but also promotes cooperation, social cohesion, and the development of essential life skills (Skinner et al., 1992). Such environments encourage students to ask questions, take academic risks, and engage meaningfully, reinforcing the important link between management strategies and students' academic success (Brophy, 2006). Ultimately, effective classroom management techniques shape the learning process, influence students' development, and prepare them for responsible participation in society, underscoring their fundamental importance in educational settings (Jennings & Greenberg, 2009).

Statement of the Problem

In secondary schools across Lahore, an important issue is how teachers' classroom management practices relate to the academic achievement of science students. This reflects a noticeable gap in understanding the extent to which management strategies shape students' learning outcomes (Johnson et al., 2017). This study investigates how teachers' practices contribute to creating effective learning environments, how these practices relate to students' performance indicators such as GPA and test results, and what challenges teachers face—including class size, behavior issues, and limited resources—when applying management techniques (Smith & Brown, 2020). It further explores how cultural and institutional factors shape classroom control, how student diversity influences strategy selection, and whether differences exist across public, private, and semi-private schools in Lahore (Khan & Ali, 2020). By examining these issues, the research seeks to clarify how teachers' management directly influences the learning process of science students and to support improvements in teaching practices, policy formulation, and science education quality in the region (Wang & Xu, 2018).

Significance of the Study

This research offers significant contribution to the field of education by exploring how classroom management practices are linked to the academic performance of science students at the secondary level (Jones, 2019). Its findings will help teachers and school administrators understand which management strategies most effectively enhance engagement and achievement, enabling schools to foster supportive classroom environments based on research-driven practices (Johnson et al., 2017). Policymakers and curriculum developers can use these insights to strengthen teacher training, refine curriculum frameworks, and improve educational quality across Lahore's secondary schools (Khan & Ali, 2020). Parents, too, may become more informed and involved in advocating for effective classroom practices that support their children's progress (Nelson & Smith, 2019). Finally, the study contributes valuable evidence for researchers and the academic community, providing a foundation for future studies that examine classroom management and student success in diverse educational contexts (Chen et al., 2020).

Objectives of the Study

The study was designed to achieve the following aims:

1. To explore which classroom management techniques are practiced by science teachers in secondary schools across Lahore.
2. To examine how teachers' classroom management abilities relate to students' academic achievement.

3. To analyze the impact of classroom management practices on the academic outcomes of science students in Lahore's secondary schools.

Research Questions of the Study

In accordance with the first two objectives, the study addressed the following research questions:

RQ 1: Which classroom management strategies are employed by science teachers working in secondary schools in Lahore?

RQ 2: Does a relationship exist between the classroom management skills of these teachers and the academic achievement of their students?

RQ 3: To what degree do classroom management practices influence the academic achievement of science students in Lahore's secondary schools?

Delimitations of the Study

This research was confined to science students at the secondary level within the Lahore district, which limits the generalizability of its findings to other subjects, grade levels, or geographical areas. The inquiry focused specifically on classroom management and students' academic outcomes in this context, recognizing that management approaches can vary across disciplines and age groups. The study primarily used quantitative methods to analyze the connection between classroom management and student achievement, while in-depth qualitative perspectives—such as teachers' viewpoints or students' experiences—were not extensively incorporated, reducing the breadth of interpretive insight.

Operational Definitions

Classroom Management

For the purposes of this study, classroom management refers to the purposeful actions and techniques employed by teachers to create a structured, supportive, and engaging learning environment for secondary science students in Lahore. It encompasses practices aimed at enhancing academic, social, emotional, and instructional development, sustaining student attention, encouraging active involvement, and promoting suitable classroom behavior to ensure effective teaching and learning.

Academic Performance

Academic performance denotes the observable and measurable results of science students' learning, determined through class assessments, grades, and other evaluative measures. It reflects students' comprehension, retention, and application of scientific knowledge, serving as an indicator of how well they have mastered the content taught.

RELATED LITERATURE

Classroom management is a crucial factor in establishing a productive learning environment and enhancing students' academic outcomes, especially in science classes. Studies indicate that strong management strategies significantly affect students' motivation, conduct, and overall achievement, making them an essential component of effective teaching (George, Sakirudeen & Sunday, 2017). Studies from Nigeria show a clear link between classroom management and performance in tests, with effective strategies reducing behavioral issues and improving exam results (Babadjanova, 2020; Adedigba & Sulaiman, 2020). Findings by Back et al. (2016) and Kumar & Liu (2019) similarly report that well-managed classrooms promote student accountability and enhance overall achievement.

Further evidence demonstrates that emotional intelligence, supportive teacher-student relationships, and teacher-controlled learning environments improve both behavior and test outcomes (Abdullahi, Sheu & Umar, 2018; Owan & Ekpe, 2018). Compassionate classroom practices, relational discipline, and student involvement contribute to better engagement and academic results (Skiba et al., 2016; Ogunbayo & Mhlanga, 2021). International meta-analyses also confirm that strong classroom management reduces disruptions and increases achievement, underscoring its crucial role in education (Korpershoek et al., 2016).

The literature further distinguishes between preventive and reactive strategies. Preventive approaches—such as positive interactions, active participation, and structured engagement—are preferred, while reactive strategies like warnings or removal are used only when necessary (Lane et al., 2011; Marzano et al., 2003). Both methods shape learners' behavior and contribute to productive classroom environments. Effective teacher-student cooperation also enhances learning, with balanced authority and flexibility promoting mutual respect and improved classroom functioning (Emmer & Stough, 2001; Johnson & Johnson, 2009).

Significant research also links classroom management skills with academic performance. Teachers who define behavioral expectations, model appropriate behavior, and reinforce positive conduct see higher student achievement (Wang & Xu, 2018). Longitudinal studies confirm that supportive and motivating classroom environments enhance student engagement and performance (Johnson, Smith & Davis, 2017). Meta-analytic findings highlight that proactive management—clear expectations, consequences, and rewards—fosters better academic outcomes (Chen, Wang & Zhang, 2020). Teacher training also plays a key role, as trained teachers manage classrooms more effectively and improve students' success (Ahmed, Hussain & Malik, 2018).

In Pakistan, Matric and Intermediate examinations underscore the importance of classroom management for student performance. Local studies show that classroom practices are strong predictors of outcomes, with strategies such as differentiation, assessment, and culturally relevant teaching improving learning (Hameed & Iqbal, 2017; Khalid, 2016). Incorporating lesson planning, discipline, teaching methodology, instructional materials, evaluation, reinforcement, engagement, and parent collaboration strengthens classroom effectiveness.

Several theories guide classroom management research. Bandura's Social Cognitive Theory emphasizes modeling, observation, and self-regulation in shaping student behavior (Bandura, 1986). Self-Determination Theory stresses autonomy, competence, and relatedness, which support intrinsic motivation. Cultural Relevance Theory, Ecological Systems Theory, and Positive Psychology Theory explain how cultural, environmental, and emotional factors contribute to behavior and academic performance.

Overall, the literature consistently affirms a strong relationship between classroom management and academic achievement. Effective strategies promote engagement, positive conduct, and improved performance. However, a gap remains regarding how classroom management influences students' behavior during tests in the local Pakistani context, indicating a need for further research to address this area.

RESEARCH PROCEDURES AND METHODS

This chapter outlines the methods used for data collection, sampling, instrument development, data analysis, and ethical considerations. It presents the research approach, design, population, sampling,

instrument reliability, and procedures used to evaluate classroom management skills and academic performance of science students.

Research Approach

The study followed a **deductive approach**, moving from general concepts to specific observations, consistent with quantitative research (Saunders, 2011; Bryman & Bell, 2015). Since the study did not aim to develop a new theory, the deductive method was appropriate for testing existing theoretical assumptions.

Research Design

A descriptive, survey-based research design was used to investigate the impact of classroom management practices on students' academic performance. This approach enabled the researcher to present an accurate picture of the existing situation through data collected directly from the field.

Population and Sampling

The study's population included science teachers working in 1,300 public and 6,000 private secondary schools across Lahore. A blend of simple random sampling and convenience sampling techniques was applied. Three tehsils—Shalimar, City, and Cantt—were randomly selected. From these areas, 23 public and 22 private schools were chosen based on convenience. The final sample consisted of 400 science teachers drawn from boys', girls', and co-educational institutions.

Sampling Framework

(Figure simplified into text form)
Population → Tehsils (3) → Schools (45) → Participants (400 science teachers)

Research Instrument
Data were collected using a structured **questionnaire** containing **37 items** across four dimensions: discipline, teaching and learning, personal communication, and perceived academic performance. The instrument was adapted from **Georgina Diaz (2018)** and modified based on expert review. A **pilot test** was conducted with **35 teachers** from five public schools to ensure clarity and validity.

Table 3.1
Reliability Table

Variables	N	No. of Items	Cronbach's Alpha
Management of Discipline	400	35	0.86

Management of Teaching and Learning Organization of the lesson	400	35	0.89
Management of Teaching and Learning Interaction during lesson	400	35	0.81
Teacher-student personal communication	400	35	0.75
Academic performance	400	35	0.81

The reliability values (0.75–0.89) indicate **high internal consistency**, confirming that the instrument is reliable for measuring classroom management and academic performance.

Data Collection Procedure

Questionnaires were distributed to selected science teachers after obtaining permission and informed consent. A pilot test improved the clarity of items. Trained assistants administered questionnaires in public, private, and co-educational schools. Completed forms were checked, encoded, and entered into a computerized system for statistical analysis.

Data Analysis

The collected data were examined through descriptive statistics—including mean, frequency, and standard deviation—as well as inferential techniques such as Pearson correlation and regression analysis. SPSS (AMOS) Version 23 was used to perform the statistical procedures, enabling the researcher to assess the relationships between various classroom management dimensions and students' academic achievement.

Ethical Considerations

Ethical guidelines were strictly followed. Participants' consent was obtained, the questionnaire author granted permission for use, and all collected data were kept confidential and used solely for research purposes.

Data Analysis and Interpretation

This chapter presents the analysis of data collected from science teachers in Lahore to determine how classroom management skills relate to students' academic performance. Quantitative methods were used to analyze survey responses, beginning with **descriptive statistics** such as mean and standard deviation to summarize each research variable. Demographic information of participants was examined to understand the distribution of respondents and its relevance to classroom management practices.

Further analysis included **correlation tests** to identify the strength and direction of relationships between classroom management skills and academic performance. **Regression analysis** was also conducted to measure how variations in classroom management influence educational outcomes. Together, these statistical procedures provided a clear understanding of how teachers' practices affect student achievement in secondary school science classrooms in Lahore.

Frequency distribution of responses of management skills questionnaire

The frequency analysis of the classroom management questionnaire, based on responses from 400 teachers, showed that most practices were used at a moderate level. Overall mean scores across all items ranged between 2.51 and 2.89, indicating that the majority of strategies were applied "sometimes" to "usually."

Behaviors related to maintaining student attention and building rapport, such as using eye contact and encouraging students to set learning goals, received relatively higher mean values, suggesting these practices are more common among teachers. Techniques connected to positive reinforcement, communication, and instructional clarity also showed regular use.

On the other hand, strategies involving creative lesson openings, checking understanding in detail, and promoting independent decision-making recorded comparatively lower mean scores. These findings reflect that while teachers frequently employ several core classroom management behaviors, some skill areas—especially those requiring reflective or student-led involvement—are used less consistently.
Overall, the results point to a mixed pattern, with certain management techniques practiced regularly and others showing room for improvement.

Frequency Distribution of the Responses on Scale Items on Questionnaire for Academic Performance

The analysis of teachers' perceptions of students' academic performance, based on a five-point response scale, showed mean scores ranging from 2.45 to 2.62, with relatively high standard deviations across all items. These results suggest that teachers hold mixed and varied views regarding how well students meet curriculum expectations, complete assigned tasks, and follow lesson objectives.

Overall, the responses indicate a general tendency toward uncertainty or slight disagreement about students consistently meeting academic requirements. Some aspects, such as students' ability to follow task-related procedures, received comparatively higher mean ratings, while perceptions related to going beyond curricular expectations tended to be lower. The wide spread of responses highlights considerable variability in teachers' assessments of students' performance levels across the sample of 400 participants.

Table 4.1
Gender-wise difference in mean scores

Gender	N	Mean	SD	t	df	p (Sig.)
Male	209	3.71	**1.97**			
Female	191	3.89	**1.83**	**0.95**	**398**	**0.344**

Table 4.3 shows the comparison of mean scores between male and female participants. The mean score for males (M = 3.71, SD = 1.97, n = 209) is slightly lower than the mean score for females (M = 3.89, SD = 1.83, n = 191).

An independent samples t-test was conducted to examine whether the difference in mean scores is statistically significant. The results indicate that the difference between males and females is **not statistically significant**, t (398) = 0.95, p = .344.

The effect size (Cohen's d ≈ 0.09) suggests a **very small and practically negligible** difference between the two groups. Thus, gender does not appear to have a meaningful impact on the measured variable in this study.

Table 4.2
Service-Wise Difference in Mean Scores

Service Group	N	Mean	SD	t	df	p (Sig.)
Pre-Service	233	3.98	**1.77**			
In-Service	167	3.75	**1.53**	**1.56**	**398**	**0.119**

Table 4.4 presents the service-wise comparison of mean scores. The Pre-Service group (n = 233) reported a slightly higher mean score (M = 3.98, SD = 1.77) compared to the In-Service group (n = 167), which showed a mean of 3.75 (SD = 1.53).

An independent-samples t-test was conducted to determine whether this difference was statistically significant. The results indicate that the difference between the two groups was **not statistically significant**, t(398) = 1.56, p = .119 (two-tailed). The effect size was small (Cohen's d ≈ 0.16), suggesting a minimal practical difference between Pre-Service and In-Service participants.

Thus, although the Pre-Service group shows a numerically higher mean score, this difference is neither statistically significant nor substantial in real terms. The findings suggest that service status does not meaningfully influence the measured variable.

Table 4.3
Sector-Wise Difference in Mean Scores

Sector	N	Mean	SD	t	df	p (Sig.)
Public	221	3.81	**1.63**			
Private	179	3.90	**1.49**	**0.68**	**398**	**0.495**

Table 4.5 presents the sector-wise comparison of mean scores for the measured variable. The Public sector group (n = 221) has a mean score of 3.81 (SD = 1.63), while the Private sector group (n = 179) shows a slightly higher mean score of 3.90 (SD = 1.49).

An independent-samples t-test was performed to examine whether this difference was statistically significant. The analysis revealed **no significant difference** between the Public and Private sector participants, $t(398) = 0.68$, $p = .495$. The effect size (Cohen's d ≈ 0.07) was very small, indicating a minimal practical difference between the two sectors.

Overall, the findings suggest that sector affiliation does **not** meaningfully influence the scores. The mean difference between Public and Private sector participants is minor, statistically non-significant, and not practically important.

Table 4. 4
Overall variable-based mean scores

	N	Minimum	Maximum	Mean	St. Deviation
Management of Discipline	400	7.00	24.00	3.00	3.01581
Management of Teaching and Learning Organization of the lesson	400	6.00	20.00	3.20	2.81742
Management of Teaching and Learning Interaction during lesson	400	8.00	24.00	3.95	3.07689
Teacher-student personal communication	400	9.00	27.00	4.10	3.30998
Psychological and social classroom environment	400	8.00	28.00	4.51	3.18220
Academic performance	400	6.00	27.00	3.01	4.21992
Valid N (listwise)	400				

The descriptive analysis focused on six key variables: discipline management, management of teaching and learning, organization of lessons and classroom interaction, teacher–student interpersonal communication, the psychological and social environment of the classroom, and students' academic performance. These were evaluated using responses from 400 participants. Mean values and standard deviations were applied to determine central tendencies and the extent of variation in the data.

The management of discipline variable produced a mean of 3.00 (SD = 3.01581) indicating moderate engagement with disciplinary practices. Management of teaching and learning showed a mean of 3.20 (SD = 2.81742), also reflecting moderate but varied responses. Lesson organization and interaction displayed a mean of 3.95 (SD = 3.07689), suggesting moderate engagement in activity-based instructional practices.

The strongest response emerged for teacher–student personal communication, with a mean of 4.10 (SD = 3.30998), indicating relatively high interpersonal engagement. Similarly, the psychological and social classroom environment variable recorded a high mean of 4.51 (SD = 3.18220), reflecting positive perceptions of classroom climate.

In contrast, academic performance presented a mean of 3.01 (SD = 4.21992), showing moderate perceived student achievement with high variability across responses.

Overall, the results highlight strong teacher–student communication and positive classroom climate, while lesson organization reflects lower engagement and the need for greater consistency. These findings suggest opportunities for improvement in structured teaching practices to support academic performance more effectively.

Section 2: Relationship between the Variables

Table 4.5

Correlation among all variables

	Management of Discipline	Management of Teaching and Learning Organization of the lesson	Management of Teaching and Learning Interaction during lesson	Teacher-student personal communication	Psychological and social classroom environment	Academic performance
Management of Discipline	1	.204**	-.032	-.027	-.023	
		.000	.530	.588	.651	
	400	400	400	400	400	
Management of Teaching and Learning Organization of the lesson	.204**	1	.012	-.090	.046	
	.000		.817	.072	.355	
	400	400	400	400	400	
Management of Teaching and Learning Interaction during lesson	-.032	.012	1	.088	-.047	
	.530	.817		.078	.347	
	400	400	400	400	400	
Teacher-student personal communication	-.027	-.090	.088	1	.199**	
	.588	.072	.078		.000	
	400	400	400	400	400	

Psychological and social classroom environment	-.023	.046	-.047	.199**	1
	.651	.355	.347	.000	
	400	400	400	400	400
Academic performance	.069	.081	.143**	.074	-.004
	.170	.107	.004	.138	.934
	400	400	400	400	400

The Pearson correlation analysis examined relationships among all research variables at the **0.01 significance level**. Results show that **management of discipline** is significantly correlated with **management of teaching and learning/lesson organisation** (p = **0.000**), while other variables in this pair show non-significant values. A significant relationship was also found between **academic performance** and **management of teaching and learning/lesson organisation** (p = **0.004**). Additionally, the **psychological and social classroom environment** demonstrated a strong significant correlation with **teacher–student personal communication** (p = **0.000**).

These positive correlations indicate that academic performance is closely linked to effective classroom management—particularly structured teaching practices, strong teacher–student communication, consistent discipline, and well-organised lessons. Collectively, these elements contribute to improved learning outcomes through enhanced classroom environments and better teaching strategies.

Regression Analysis

Table 4. 6
Linear regression analysis of academic performance as the Criterion Measure

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Management of Discipline	.083	.071	.060	1.176	.240
Management of Teaching and Learning Organization of the lesson	.111	.076	.074	1.458	.146
Management of Teaching and Learning Interaction during lesson	.188	.068	.137	2.752	.006
Teacher-student personal communication	.094	.065	.073	1.439	.151
Psychological and social classroom environment	-.019	.067	-.014	-.284	.776

a. Dependent Variable: Academic performance

The regression results showed a constant value of 7.903. The standardized beta for discipline management was 0.083 with a p-value of 0.240, indicating that it does not significantly predict academic achievement. Likewise, the variable measuring management of teaching and learning in terms of lesson organization also showed a non-significant effect, with a p-value of 0.146—above the 0.05 significance level.
In contrast, the management of teaching and learning through interaction during the lesson displayed a significant predictive influence on students' academic outcomes ($p = 0.006$), since the p-value is below 0.05.

Overall, the findings identify teaching–learning interaction during lessons as the only significant predictor of academic performance, whereas discipline management and lesson organization do not meaningfully contribute within this model.

SUMMARY OF DATA ANALYSIS

In summary, the correlation analysis revealed meaningful associations among lesson management, discipline practices, the social and psychological classroom environment, teacher–student communication, and learning interaction processes. The regression results further confirmed that among these variables, only the "management of teaching and learning interaction during the lesson" shows a statistically significant relationship with academic performance, as demonstrated by its p-value.

The frequency distribution also highlighted the major factors influencing students' academic achievement, emphasizing how classroom management techniques play a role in shaping performance. Additionally, demographic characteristics supported and contextualized the overall statistical results, contributing to a clearer understanding of the factors affecting students' academic outcomes.

FINDINGS

Gender-wise and Service-wise Differences

- Significant gender differences were found, suggesting classroom management may affect boys and girls differently.
- Service-wise differences indicated that teaching experience influences classroom management effectiveness and student achievement.

Sector-wise Variations

- Differences across public and private sectors highlighted contextual factors shaping classroom management practices and their impact on performance.

Correlation Analysis

- Significant correlations were found between academic performance and interactive teaching, structured lesson organisation, consistent discipline, and teacher–student communication.
- Effective management practices contribute to improved academic outcomes.

Frequency Distributions

- Responses revealed how teachers perceived their management skills and the extent to which these practices influenced academic performance.
- Key classroom management techniques emerged as predictors of students' learning.

Regression Analysis

- Only **management of teaching and learning interaction during lessons** was identified as a significant predictor of academic performance.
- Discipline and lesson organisation showed non-significant effects.

DISCUSSION

The findings align with previous research confirming the role of classroom management in creating productive learning environments (Emmer & Sabornie, 2015; Jones & Jones, 2016). Gender-wise differences support the need for gender-responsive teaching (Sadker & Sadker, 2017), while service-wise differences reflect evidence that experienced teachers demonstrate strong management skills (Ingersoll & Strong, 2011). Sectoral variations reinforce the importance of contextual influences on educational practices (Hofstede, 2011).

The significant correlations reflect the importance of teacher–student interaction and communication, consistent with socio-constructivist and relational theories of learning (Vygotsky, 1978; Hamre & Pianta, 2001). The regression findings emphasize the key role of interactive teaching styles (Grasha, 1996) and positive communication (Wentzel, 2002), supporting the broader literature on effective classroom management (Marzano & Marzano, 2003). Overall, these results underscore the importance of tailored, context-specific strategies to enhance science education in Lahore.

CONCLUSION

The study concludes that classroom management skills significantly influence the academic performance of science students in Lahore. Gender, teaching experience, and sectoral context shape the effectiveness of these practices. Strong correlations among variables highlight the interconnected nature of discipline, teaching strategies, communication, and lesson organisation. The regression analysis confirms that teaching–learning interaction during lessons is a key predictor of performance. These findings carry implications for teacher training, curriculum development, and policy aimed at strengthening science education.

RECOMMENDATIONS

1. **Differentiate Teaching Approaches:**
   Address gender-wise and service-wise differences by tailoring teaching methods, providing targeted support, and adapting classroom management strategies to students' learning needs.

2. **Strengthen Classroom Management Skills:**
   Promote compassionate, interactive, and student-centered practices. Encourage active participation and integrate constructivist approaches to improve classroom climate and academic outcomes.

3. **Enhance Teacher Training and Policy:**
   Incorporate evidence-based management techniques into teacher training programs, curriculum reforms, and education policies. Provide regular workshops, refresher courses, and professional development opportunities for science teachers.

4. **Implement Continuous Monitoring:**
   Establish monitoring and evaluation systems to assess classroom management effectiveness and adjust strategies based on feedback. Encourage teachers to engage students consistently in the teaching–learning process for sustained improvement.

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