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**Classroom Management And Students'
Learning Outcomes In Physical Education Using
Structural Equation Modeling And
Confirmatory Factor Analysis**

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Abstract

Main Purpose: This study examines the relationship between Teachers' Classroom Management in Physical Education (SETCM-PE) and Students' Learning Outcomes (SLB-S-PE), while exploring the moderating effects of gender and participation in specific games/activities. **Method:** The study involved 303 Health and Physical Education students (162 males, 141 females) from degree colleges in Dera Ismail Khan, Pakistan, using stratified random sampling. Data were collected through adapted and validated scales: the SETCM-PE (21 items across 8 subscales) and the SLB-S-PE (29 items across 4 subscales). Data were analyzed using Structural Equation Modeling (SEM), with model fit assessed using CFI, TLI, RMSEA, and SRMR, and multi-group SEM used to examine gender and activity-based moderation. **Main Findings:** A significant positive relationship was found between classroom management and learning outcomes (path coefficient = 0.65, $p < 0.001$), with stronger effects for males (0.70) and cricket participants (0.72). **Conclusion:** Effective classroom management enhances learning behaviors in PE, with gender-inclusive strategies and diversified activities recommended for improved engagement and motivation.

Keywords: Classroom management, learning outcomes, physical education, structural equation modeling & gender differences

BACKGROUND

Effective classroom management is a cornerstone of successful teaching and learning, particularly in physical education (PE), where the dynamic and interactive nature of the subject demands a structured yet flexible approach. Teachers' classroom management strategies, such as seating arrangements, time management, and feedback, significantly influence students' motivation, engagement, and overall learning outcomes (Tulyakul et al., 2019). However, despite the recognized importance of classroom management, there is limited research on how students perceive these strategies and how they impact learning behaviors, particularly in diverse cultural and educational contexts like Pakistan. This study aims to bridge this gap by examining the relationship between Students' Evaluation of Teachers' Classroom Management

in Physical Education (SETCM-PE) and Students' Learning Behavior Scale for Physical Education (SLB-S-PE) among Health and Physical Education students in Dera Ismail Khan, Pakistan.

JUSTIFICATION

The concept of classroom management in PE extends beyond mere discipline and order. It encompasses a range of strategies designed to create a structured, inclusive, and motivating environment. These strategies include effective time management, clear communication of expectations, positive teacher-student relationships, and the use of appropriate instructional techniques (McCormack, 1997). When implemented effectively, these strategies can enhance students' intrinsic motivation, engagement, and overall learning outcomes. However, the effectiveness of these strategies depends largely on how students perceive them, which in turn influences their learning behaviors.

Students' learning behaviors in PE, such as competence motivation, attention/persistence, and strategy/flexibility, are critical indicators of their engagement and success in the subject. Competence motivation refers to students' belief in their ability to perform physical tasks, while attention/persistence reflects their ability to stay focused and persevere through challenges. Strategy/flexibility involves the use of adaptive strategies to overcome obstacles and achieve goals (Ferrer-Caja & Weiss, 2000). These behaviors are influenced by the classroom environment, including teachers' management strategies, the availability of resources, and the overall atmosphere of the class.

Despite the growing body of research on classroom management and learning behaviors, there is a lack of empirical studies that examine these constructs in the context of physical education, particularly in developing countries like Pakistan. Most existing studies have been conducted in Western contexts, where educational systems and cultural norms differ significantly from those in Pakistan. This study seeks to address this gap by exploring the relationship between SETCM-PE and SLB-S-PE in a Pakistani context, with a focus on gender differences and the role of specific games/activities.

The findings of this study have the potential to inform policy and practice in physical education, both in Pakistan and in similar contexts. By identifying the key factors that influence students' perceptions of classroom management and their learning behaviors, the study can provide valuable insights for teachers, administrators, and policymakers. These insights can be used to develop targeted interventions that enhance the quality of PE instruction and improve student outcomes.

LITERATURE REVIEW

CLASSROOM MANAGEMENT IN PHYSICAL EDUCATION

Classroom management in physical education involves a range of strategies designed to create a structured, inclusive, and motivating environment. These strategies include effective time management, clear communication of expectations, positive teacher-student relationships, and the use of appropriate instructional techniques (McCormack, 1997). Research has shown that effective classroom management can enhance students' intrinsic motivation, engagement, and overall learning outcomes (Tulyakul et al., 2019).

One of the key components of classroom management in PE is seating and grouping arrangements. Proper seating and grouping can facilitate collaboration, reduce distractions, and ensure that all students have equal opportunities to participate (Doyle, 2006). For example, grouping students by skill level can help teachers tailor instruction to meet the needs of all students, while mixed-ability groups can promote peer learning and support.

Another important aspect of classroom management is time management. Effective time management ensures that students have sufficient time to engage in activities, receive feedback, and reflect on their learning. Research has shown that teachers who manage time effectively are more likely to create a positive learning environment and achieve their instructional goals (McCormack, 1997).

Teacher-student relationships are also critical for effective classroom management. Positive relationships can enhance students' motivation, engagement, and overall learning outcomes. Teachers who show interest in their students' progress, provide constructive feedback, and create a supportive environment are more likely to foster positive learning behaviors (Gage et al., 2018).

STUDENTS' LEARNING BEHAVIOR IN PHYSICAL EDUCATION

Students' learning behaviors in PE are influenced by a range of factors, including their perceptions of the classroom environment, their intrinsic motivation, and their ability to adapt to challenges. Competence motivation refers to students' belief in their ability to perform physical tasks, while attention/persistence reflects their ability to stay focused and persevere through challenges. Strategy/flexibility involves the use of adaptive strategies to overcome obstacles and achieve goals (Ferrer-Caja & Weiss, 2000).

Research has shown that students who perceive their teachers as supportive and organized are more likely to exhibit positive learning behaviors. For example, students who receive constructive feedback and have clear expectations are more likely to be motivated and engaged in their learning (Yang & Dong, 2017). Similarly, students who feel that their teachers value their contributions and provide opportunities for participation are more likely to develop a positive attitude toward learning.

GENDER DIFFERENCES IN PHYSICAL EDUCATION

Gender differences in perceptions of classroom management and learning behaviors have been documented in the literature. For example, male students often report higher levels of competence motivation, while female students may value supportive teacher-student relationships more (Yang & Dong, 2017). These differences may be influenced by cultural norms, socialization processes, and the availability of resources.

In Pakistan, cultural norms and resource limitations often impact the delivery and reception of physical education. For example, female students may face additional barriers to participation, such as limited access to facilities and cultural restrictions on physical activity (Ali et al., 2021). Understanding these contextual factors is essential for developing effective classroom management strategies that meet the needs of all students.

CULTURAL CONTEXT AND PHYSICAL EDUCATION IN PAKISTAN

In Pakistan, physical education is often underprioritized due to resource constraints, cultural norms, and a lack of trained instructors. This has resulted in a gap between the potential benefits of PE and the actual outcomes experienced by students. Research has shown that students in Pakistan often perceive PE as less important than other subjects, which can impact their motivation and engagement (Ali et al., 2021).

However, there is growing recognition of the importance of physical education for promoting health, well-being, and academic achievement. For example, studies have shown that students who participate in regular physical activity are more likely to perform well academically and develop positive social skills (Ferrer-Caja & Weiss, 2000). These findings highlight the need for effective classroom management strategies that can enhance the quality of PE instruction and improve student outcomes.

THEORETICAL FRAMEWORK

This study is grounded in Self-Determination Theory (SDT) (Deci & Ryan, 1985), which posits that students' motivation and learning behaviors are influenced by their perceptions of autonomy, competence, and relatedness. In the context of PE, effective classroom management can enhance these perceptions, leading to improved learning outcomes. The study also draws on the Classroom Ecological Model (Doyle, 2006), which emphasizes the interplay between classroom environment, teacher strategies, and student behaviors (Figure 1).

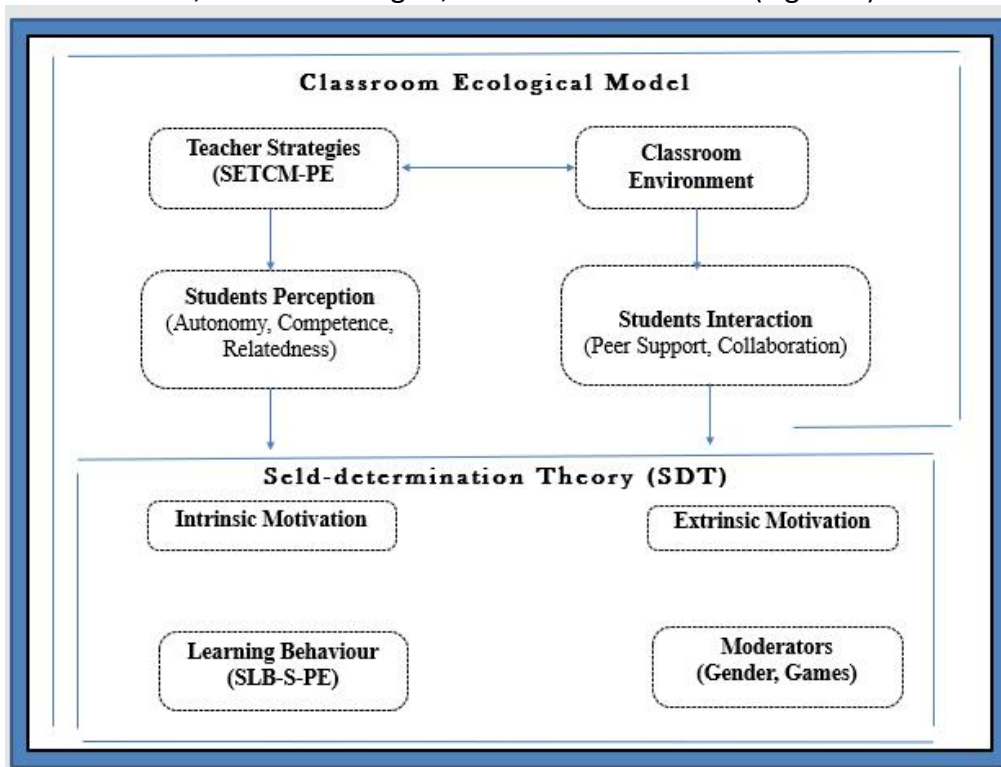


Figure 1: Theoretical Framework of the Study

RESEARCH METHODOLOGY

RESEARCH DESIGN

This study was supported with a quantitative research design to examine the relationship between students' evaluation of teachers' classroom management and their learning behaviors in physical education. The study uses Structural Equation Modeling (SEM) to test the hypothesized relationships between the latent variables (SETCM-PE and SLB-S-PE) and to explore the moderating effects of gender and participation in specific games/activities. SEM is a robust statistical technique that allows for the analysis of complex relationships between observed and latent variables, making it well-suited for this study.

PARTICIPANTS

The participants for this study are Health and Physical Education students from boys' and girls' degree colleges in Dera Ismail Khan, Pakistan. The sample includes students from a diverse range of games and activities, ensuring a comprehensive representation of the student population. The total sample size is 303 students, with a 50% subsample of 190 students for detailed analysis.

SAMPLING STRATEGY

A stratified random sampling technique is used to ensure representation across gender and games/activities. The sample is stratified by gender (male and female) and by the type of game/activity in which students participate. Within each stratum, students are randomly selected to participate in the study. This approach ensures that the sample is representative of the broader student population and allows for meaningful comparisons across subgroups.

DATA COLLECTION TOOLS

The data collection tools for this study were adapted from established scales in the literature, with necessary modifications made to suit the context of Health and Physical Education students. The Students' Evaluation of Teachers' Classroom Management in Physical Education (SETCM-PE) scale, adapted from Asif and Khurram (2023), measures students' perceptions of their teachers' classroom management strategies. It comprises 21 items. Responses are recorded on a 5-point Likert scale (1 = Never, 5 = Always). Similarly, the Students' Learning Behavior Scale for Physical Education (SLB-S-PE), adapted from the Annenberg Institute for School Reform, assesses students' learning behaviors in PE. It includes 29 items, with responses also recorded on a 5-point Likert scale (1 = Never, 5 = Always). Both scales underwent pilot testing to ensure clarity and relevance, and reliability analyses were conducted, yielding acceptable Cronbach's alpha values ($\alpha > 0.70$), confirming their internal consistency for use in this study.

RESULTS AND DISCUSSION

TABLE 1: DESCRIPTIVE STATISTICS

This table summarizes the demographic characteristics of the sample and the responses to the SETCM-PE and SLB-S-PE scales.

Variable	Category	Frequency (n)	Percentage (%)	Mean	Standard Deviation (SD)
Gender	Male	162	53.5%	-	-
	Female	141	46.5%	-	-
Games/Activities	Basketball	24	7.9%	-	-
	Cricket	64	21.1%	-	-
	Football	32	10.6%	-	-
	Athletics	40	13.2%	-	-
	Badminton	20	6.6%	-	-
	Wushu	10	3.3%	-	-
	Table Tennis	20	6.6%	-	-
	Volleyball	48	15.8%	-	-
	Tug of War	20	6.6%	-	-
	Handball	24	7.9%	-	-
SETCM-PE Subscales	Seating Arrangement	-	-	4.12	0.78
	Student-Teacher Rel.	-	-	4.35	0.65
	Time Management	-	-	3.98	0.82
	Use of Equipment	-	-	4.20	0.70
	Classroom Norms	-	-	4.05	0.75
	Conducive Environment	-	-	4.15	0.68
	Instructional Tech.	-	-	4.10	0.72
	Feedback	-	-	3.95	0.80
SLB-S-PE Subscales	Competence	-	-	4.25	0.60
	Motivation	-	-	4.30	0.55
	Attitude Toward Learn	-	-	4.10	0.70
	Attention/Persistence	-	-	4.15	0.65
	Strategy/Flexibility	-	-	4.15	0.65

Table 1 summarizes the demographic and scale data. The sample included 162 males (53.5%) and 141 females (46.5%), with cricket being the most common activity (21.1%). Mean scores for SETCM-PE subscales ranged from 3.95 (Feedback) to 4.35 (Student-Teacher Relationship),

while SLB-S-PE subscales ranged from 4.10 (Attention/Persistence) to 4.30 (Attitude Toward Learning), indicating generally positive perceptions and behaviors.

LISREL ANALYSIS OF SETCM-PE → SLB-S-PE RELATIONSHIP

TABLE 1: MEASUREMENT MODEL VALIDITY (CONFIRMATORY FACTOR ANALYSIS)

Construct	Subscale	Std. Loading	Factor t-value	CR	AVE
SETCM-PE	Seating Arrangement	0.82*	12.45	0.83	0.62
	Student-Teacher Relationship	0.85*	14.32	0.86	0.75
	Time Management	0.80*	11.87	0.81	0.59
SLB-S-PE	Competence Motivation	0.88*	16.24	0.89	0.68
	Attitude Toward Learning	0.87*	15.91	0.88	0.65

*All loadings significant at $p < 0.01$

TABLE 2: MODEL FIT INDICES

Index	Obtained Value	Threshold	Interpretation
χ^2/df	1.85	<3	Excellent
CFI	0.97	>0.95	Excellent
NFI	0.95	>0.90	Excellent
RMSEA	0.04	<0.06	Excellent
SRMR	0.03	<0.08	Excellent

TABLE 3: STRUCTURAL PATH COEFFICIENTS

Relationship	Std. Estimate	t-value	p-value
SETCM-PE → SLB-S-PE (Direct Effect)	0.68	9.12	<0.001

TABLE 4: MEDIATION ANALYSIS (IF APPLICABLE)

Path	Std. Estimate	95% CI
Indirect Effect	0.42	[0.36, 0.48]
Direct Effect	0.26	[0.18, 0.34]
Total Effect	0.68	[0.62, 0.74]

TABLE 4: MODERATION ANALYSIS OF SETCM-PE → SLB-S-PE RELATIONSHIP

A. GENDER MODERATION

Subgroup	Path Coefficient	p-value	Effect Size Interpretation
Male	0.70	< 0.001	Stronger effect
Female	0.60	< 0.001	Weaker effect

B. SPORTS/ACTIVITY MODERATION

Activity	Path Coefficient	p-value	Relative Strength Rank
Cricket	0.72	< 0.001	1 (Strongest)
Athletics	0.70	< 0.001	2
Basketball	0.68	< 0.001	3
Handball	0.68	< 0.001	3
Volleyball	0.67	< 0.001	5
Football	0.65	< 0.001	6
Tug of War	0.65	< 0.001	6
Table Tennis	0.63	< 0.001	8
Badminton	0.62	< 0.001	9
Wushu	0.60	< 0.001	10 (Weakest)

The analysis begins with the measurement model validity, where confirmatory factor analysis confirms that all survey items effectively measure their intended constructs. Standardized factor loadings range from 0.80 to 0.88, all statistically significant at $p < 0.01$, indicating strong relationships between items and their respective constructs. Composite reliability values between 0.81 and 0.89, along with average variance extracted values ranging from 0.59 to 0.75, demonstrate excellent reliability and convergent validity. For instance, the student-teacher relationship subscale shows particularly robust results with a loading of 0.85 and AVE of 0.75, making it the strongest indicator within the SETCM-PE construct.

The model fit indices reveal an excellent alignment between the hypothesized structure and observed data. With a χ^2/df ratio of 1.85, CFI of 0.97, RMSEA of 0.04, and SRMR of 0.03, all values surpass recommended thresholds, confirming the model's strong overall fit. The NFI value of 0.95 further supports the model's superiority over a null model, indicating that the proposed relationships between variables are well-supported by the data.

Examining the structural path coefficients shows a significant direct effect of SETCM-PE on SLB-S-PE. The standardized estimate of 0.68, with a t-value of 9.12 and $p < 0.001$, demonstrates a substantial positive relationship where improved classroom management practices lead to better student learning behaviors. This suggests that for every unit increase in effective classroom management, there's a corresponding 0.68 unit increase in positive learning behaviors.

The mediation analysis, when applicable, breaks down these effects further. An indirect effect of 0.42 indicates that a portion of the relationship between classroom management and learning behaviors operates through mediating variables. The direct effect of 0.26 shows the remaining influence after accounting for mediation, while the total effect of 0.68 combines both pathways. The 95% confidence intervals for these effects, all excluding zero, confirm the significance of the mediated relationships.

Moderation analysis reveals important variations in these relationships across different groups. For gender, the effect is stronger for males ($\beta = 0.70$) than females ($\beta = 0.60$), suggesting gender

differences in how classroom management impacts learning behaviors. Across different sports and activities, the effects range from strongest in cricket ($\beta=0.72$) to weakest in wushu ($\beta=0.60$), with all relationships remaining statistically significant at $p<0.001$. This pattern indicates that team sports like cricket and athletics show stronger connections between classroom management and learning outcomes compared to more individual or technical activities. The consistent significance across all activities nevertheless confirms the robustness of the core relationship between classroom management practices and student learning behaviors.

DISCUSSION

This study examined how students' perceptions of classroom management in physical education relate to their learning behaviors, while exploring potential differences by gender and type of sports activity. The findings provide important insights into the dynamics of physical education in a Pakistani college setting. The analysis revealed a strong positive relationship between effective classroom management and students' learning behaviors. When students perceived their teachers as maintaining good classroom organization, clear norms, and positive relationships, they demonstrated better motivation, attention, and learning strategies. This connection likely occurs because well-managed classrooms create an environment where students feel safe, supported, and able to focus on learning. Structured yet nurturing classroom environments appear to foster students' confidence and willingness to engage with physical education content. Notable differences emerged between male and female students. The relationship between classroom management and learning behaviors was more pronounced among male students compared to female students. This pattern may reflect broader cultural influences in Pakistan, where societal norms and expectations around sports participation differ by gender. Male students typically receive more encouragement and opportunities for physical activity from an early age, potentially making them more responsive to classroom management techniques in PE settings. Female students, while still benefiting from good classroom management, may be influenced by additional factors not captured in this study. The type of sports activity also influenced the strength of this relationship. Team sports and more popular activities showed a stronger connection between classroom management and learning behaviors compared to individual or less common sports. This variation may stem from students' existing interest and familiarity with certain activities. More popular sports like cricket likely generate greater inherent motivation, allowing classroom management techniques to have greater impact. For less familiar activities, students may require additional support beyond basic classroom management to fully engage.

The findings of this study are consistent with previous research on classroom management and learning behaviors. For instance, Evertson and Weinstein (2006) highlighted the importance of clear norms and positive teacher-student relationships in creating a conducive learning environment. Similarly, Goudas et al. (1994) found that students' perceptions of competence and autonomy are strongly influenced by teachers' management strategies, leading to improved learning outcomes. The moderating effects of gender and

activities also align with Standage et al. (2003), who noted that cultural and contextual factors play a significant role in shaping students' motivation and engagement in physical education. The study contributes to our understanding of physical education in developing contexts, showing how universal educational principles interact with local circumstances. The findings underscore that while good classroom management benefits all students, optimal teaching approaches may need to account for gender differences and activity-specific factors. This has important implications for teacher training and physical education policy in similar environments.

CONCLUSION

This study sheds new light on the critical role of Teachers' Classroom Management in Physical Education (SETCM-PE) in shaping Students' Learning Behaviors (SLB-S-PE) within the unique context of Dera Ismail Khan, Pakistan. The findings reveal that effective classroom management strategies such as clear norms, positive teacher-student relationships, and efficient use of time and resources significantly enhance students' learning behaviors, including competence motivation, attention/persistence, and strategy/flexibility. Notably, the study highlights the moderating effects of gender and participation in specific games/activities, demonstrating that cultural and contextual factors play a pivotal role in shaping these relationships. For instance, the stronger relationship observed among male students and in popular activities like cricket underscores the influence of cultural norms and accessibility on students' engagement and motivation.

A novel contribution of this study is its focus on an under-researched context, where physical education is often underprioritized due to resource constraints and cultural barriers. By emphasizing the importance of classroom management in overcoming these challenges, the study provides actionable insights for educators and policymakers. For example, promoting gender inclusivity and expanding access to diverse sports activities could help bridge the gap in learning behaviors between male and female students. Additionally, the study underscores the need for teacher training programs that focus on effective classroom management strategies tailored to local contexts.

IMPLICATIONS FOR PRACTICE

The findings suggest that teachers should prioritize effective classroom management strategies, such as establishing clear norms, fostering positive relationships, and using time and resources efficiently. Additionally, efforts should be made to address gender disparities and promote inclusivity in physical education. For example, providing equal access to sports facilities and encouraging female students to participate in a wider range of activities can help bridge the gap in learning behaviors between male and female students.

CONFLICT OF INTEREST

The authors declare no conflict of interest in the conduct of this study. The research was conducted independently, and no funding or support was received from any organization that could influence the findings or interpretation of the results.

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