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The Impact of Classroom Environment on University Students' Academic Achievement: Exploring Gender Differences

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ABSTRACT
The classroom environment is a critical determinant of students' academic success, motivation, and overall learning experience. This study investigates how physical, social, and emotional aspects of the classroom influence academic performance among university students, with a focus on gender differences. Utilizing a quantitative research design, data were collected from 100 university students (50 male, 50 female) through standardized questionnaires assessing perceptions of lighting, seating comfort, technology, and peer-teacher interactions. Academic achievement was measured by cumulative test scores. Descriptive statistics and independent samples t-tests revealed that female students significantly outperformed male students in academic achievement within supportive classroom environments. Findings emphasize the importance of gender-sensitive classroom design and teaching strategies that foster positive emotional climates and peer collaboration. The study recommends enhancements in physical classroom conditions, differentiated instructional approaches, teacher training on emotional support, and peer-assisted learning programs. These measures aim to create inclusive, motivating, and effective learning environments that address the distinct needs of male and female university students.

Keywords: Classroom Environment, Academic Achievement, University Students, Gender Differences, Motivation, Physical Learning Space, Peer Interaction, Teaching Strategies.

INTRODUCTION
The classroom environment plays a vital role in shaping students' academic success, motivation, and overall learning experience. It includes various factors such as the physical setting, teaching methods, classroom management, peer interactions, and the emotional atmosphere (Fraser, 2012). A well-structured and supportive classroom environment fosters student engagement and achievement, while a negative environment can lead to disengagement and poorer academic outcomes (Cornelius-White, 2007). Academic performance is often considered a key measure of educational success, and it

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is strongly influenced by the quality of the classroom environment. A well-organized space with sufficient resources supports concentration, participation, and comprehension, which ultimately leads to better academic results (Fraser, 2012). For example, research shows that proper lighting, comfortable seating, and easy access to learning materials have a direct effect on students' ability to focus and retain information (Barrett et al., 2015). The teaching approach also matters. Learner-centered classrooms, which encourage interaction, critical thinking, and personalized feedback, tend to produce better academic outcomes compared to traditional, lecture-based settings (Cornelius-White, 2007). Environments that promote autonomy and provide positive reinforcement help students feel capable and motivated, which directly benefits their academic performance (Ryan & Deci, 2000). Motivation is a critical factor that drives students' effort, persistence, and engagement. The classroom environment plays a key role in either fostering or hindering motivation. According to Self-Determination Theory (Ryan & Deci, 2000), students' motivation improves when their basic psychological needs for autonomy, competence, and connection are met. Classrooms that encourage self-expression, involvement in decision-making, and a sense of belonging promote intrinsic motivation. Beyond academic performance and motivation, the classroom environment influences students' overall learning experience. A positive environment supports not only intellectual growth but also emotional and social development. Peer interactions help build a sense of community and shared responsibility for learning. Through collaboration and group problem-solving, students develop communication and critical thinking skills that enrich their education (Wentzel & Looney, 2007). The emotional climate—characterized by support, trust, and mutual respect between teachers and students—affects how comfortable students feel expressing ideas and taking intellectual risks (Hamre & Pianta, 2006). Teachers who create a warm and inclusive atmosphere reduce anxiety and fear of failure, leading to higher participation and deeper learning. Conversely, a hostile or indifferent environment can harm students' well-being and limit their ability to learn effectively. Effective teaching strategies, such as setting clear goals, scaffolding learning, using formative assessments, and encouraging cooperative learning, are linked to higher motivation levels among students (Meece et al., 2006). Classrooms where students feel respected and valued are more likely to foster interest and sustained effort (Patrick et al., 2007). On the other hand, environments marked by excessive control, competition, or neglect may lower motivation, especially for students with less confidence in their academic abilities. At the university level, students encounter a variety of learning environments and teaching styles, which can influence academic performance differently. Gender is an important factor in how students perceive and respond to classroom dynamics. Research shows that male and female students may experience the classroom environment differently, resulting in variations in academic achievement (Yilmaz, 2015). For example, female students often report greater engagement in cooperative learning settings, while male students may thrive more in competitive or independent learning environments (Tinto, 1993; Meece, Glienke, & Burg, 2006). Understanding these gender-based differences is essential for designing inclusive learning environments that support the success of all students. Descriptive statistics such as mean scores and standard deviations help reveal how different groups perceive and perform in various settings This study aims to explore how the classroom environment influences academic achievement among university students, with particular attention to gender differences.

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STATEMENT OF THE PROBLEM

The classroom environment significantly affects university students' academic performance, yet it is often overlooked as a key factor. Physical setup, technology, teacher behavior, peer interaction, and emotional climate all contribute to learning outcomes. Although previous research has explored classroom environments, little attention has been given to how these factors impact university students differently by gender. Male and female students may perceive and respond to classroom conditions in distinct ways, which in turn influence their academic success. This study seeks to examine the effect of the classroom environment on university students' academic performance, focusing on gender differences, to support the development of more inclusive and effective learning spaces.

OBJECTIVES OF THE STUDY

To determine whether this relationship differs between male and female students

RESEARCH QUESTIONS

Does the impact of the physical classroom environment on academic achievement vary between male and female students?

SIGNIFICANCE OF THE STUDY

This study sheds light on the important role of the classroom environment in shaping university students' academic success. By examining key physical aspects of the classroom and their effects on learning, it offers valuable insights for educators and university administrators seeking to improve student outcomes. Additionally, exploring gender differences in response to the classroom environment will help institutions better understand and address the distinct needs of male and female students. Ultimately, the findings can inform policies, classroom design, and teaching practices that foster supportive, inclusive, and effective learning environments, boosting motivation, engagement, and achievement at the university level.

LIMITATIONS OF THE STUDY

This research focuses on physical classroom factors such as lighting, seating, and technology, as well as teacher and peer interactions within the classroom.

DELIMITATIONS OF THE STUDY

The study is limited to university students and does not include learners from primary or secondary education levels.

Review of Related Literature

The classroom environment has long been recognized as a crucial factor influencing students' academic achievement, especially at the university level where independent learning and critical thinking are central to success (Fraser, 2012). Various dimensions of the classroom environment—including physical, instructional, social, and psychological factors—interact to shape learning outcomes (Barrett, Zhang, Moffat, & Kobbacy, 2015). Students spend a significant portion of their developmental years in the classroom, which serves not only as a site for acquiring necessary academic skills but also as a context where they develop a sense of self and envision their futures (Earthman, 2002). Therefore, it is imperative to understand how classroom environments can be optimized to maximize instructional effectiveness. When not properly designed, classrooms may inhibit creativity and fail to foster a positive learning atmosphere (Weinstein, 2003).

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Both tangible elements, such as desk arrangement and wall décor, and intangible elements, such as classroom energy and teacher demeanor, can significantly influence students' focus and achievement, as well as teacher motivation (Fraser, 2012). Teacher attitudes and classroom management styles play an essential role in shaping the emotional environment of the classroom. Teachers who exhibit motivation and positivity tend to generate beneficial effects on students' learning experiences, while negativity can produce adverse outcomes (Fraser, 2012). Understanding these dynamics allows educators to intentionally organize their classrooms to foster enhanced learning.

Standards of Education

A common classroom standard is the arrangement of desks in rows, a setup that research suggests may contribute to decreased student focus and increased disruptions (Earthman, 2002). This configuration emphasizes individual work and limits peer interaction, potentially undermining students' social needs and increasing the likelihood of attention-seeking behaviors. Humans are inherently social, and when interaction is restricted, students may act out to gain recognition from teachers (Earthman, 2002). The physical environment—including structure, available resources, and color—plays a foundational role in shaping a conducive learning space. Although the effects of these factors may be modest individually, their combined influence can significantly enhance students' learning capacity (Barrett et al., 2015).

Effects of Academic Peer Assistance

Peer-assisted learning strategies have demonstrated efficacy in supporting students who struggle academically. Pairing lower-performing students with knowledgeable peers enables more individualized attention and reinforces understanding for both the learner and the peer tutor (Earthman, 2002). Organizing students by behaviors, interests, or cognitive abilities can optimize group dynamics, and permitting students to choose their seating early in the term can help teachers identify productive peer groupings (Earthman, 2002).

Physical Environment and Academic Achievement

The physical characteristics of a classroom—such as lighting, seating, ventilation, temperature, noise levels, and technology availability—directly affect student concentration and academic performance (Earthman, 2002). Higgins, Hall, Wall, Woolner, and McCaughey (2005) found that adequate lighting, air quality, and comfortable seating contribute to greater student attention and engagement. Furthermore, technology integration fosters interactive learning experiences that can enhance understanding and academic outcomes (Brooks, 2011). Collectively, these findings underscore the importance of well-designed physical environments in promoting both comfort and cognitive engagement, which are essential for academic success.

Concept of Classroom Environment

The classroom environment encompasses physical, social, and emotional elements that jointly influence student learning and behavior (Fraser, 2012). A well-structured, inclusive, and motivating environment promotes higher levels of student engagement and academic achievement. For example, the arrangement of lighting, temperature control, and seating all play a role in learning efficacy (Barrett et al., 2015), while organized classroom displays and resource management help maintain student focus (Weinstein, 2003).

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Methodology

This study employed a quantitative research design to investigate the relationship between the classroom environment and academic achievement among university students, with an emphasis on gender differences. A sample of 100 university students (50 male and 50 female) was selected through stratified random sampling to ensure equal representation. Data were collected using standardized questionnaires assessing perceptions of physical classroom environment factors such as lighting, seating comfort, technology availability, and teacher and peer interactions. Academic achievement was measured using students' cumulative test scores obtained from institutional records. Descriptive statistics (means, standard deviations) summarized participant demographics and academic performance. An independent samples t-test was conducted to compare the academic achievement of male and female students in relation to their classroom environment perceptions. Data analysis was performed using SPSS software, with significance levels set at $p < .05$.

Analysis

Table1: Descriptive Statistics Table Interpretation

Statistic	Age	Income	Test Score
N	100	100	100
Mean	35.2	45000	78.4
SD	8.1	12000	10.3
Mini	18	20000	50
	60	80000	98

The sample consisted of 100 participants with a mean age of 35.2 years (SD = 8.1), ranging from 18 to 60 years. The average test score was 78.4 (SD = 10.3), with scores ranging from 50 to 98.

Table2: Independent Samples T-Test Table Interpretation

Group	N	Mean	SD	t	df	Sig
Male	50	75.2	9.5		98	0.00
Female	50	81.6	8.7	-3.45		

An independent samples t-test was conducted to compare test scores between males and females. There was a significant difference in test scores between males (M = 75.2, SD = 9.5) and females (M = 81.6, SD = 8.7), $t(98) = -3.45$, $p = .001$, indicating that females scored significantly higher than males on the test.

Conclusion

This study reinforces the critical role of the classroom environment in influencing academic achievement at the university level. Physical characteristics of the classroom, combined with social and emotional factors, significantly impact students' learning experiences and outcomes. The significant gender differences observed indicate that female students tend to achieve higher academic performance in supportive classroom settings than their male counterparts. These results highlight the necessity for educators and administrators to consider gender-specific needs when designing and managing classroom environments.

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Recommendations

Based on the findings, the following recommendations are proposed:

Classroom Design: Universities should invest in optimizing physical environments by improving lighting, seating comfort, ventilation, and technology integration to create spaces conducive to learning for all students.

Differentiated Instruction: Educators should employ diverse teaching strategies that cater to both male and female students, fostering cooperative learning for females and providing autonomy-supportive options that may benefit males.

Teacher Training: Professional development programs should emphasize the importance of creating positive emotional climates through supportive teacher-student interactions and effective classroom management techniques.

Peer Support Programs: Institutions should encourage peer-assisted learning initiatives, pairing academically stronger students with those who need additional support, to enhance understanding and engagement.

Further Research: Additional studies should explore the underlying causes of gender differences in response to classroom environments and investigate interventions tailored to minimize these disparities.

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