**Title:** *A Comparative Analysis of the Effects of Classroom Temperature on Student Concentration Levels*

**Abstract:**

The increasing awareness of environmental factors affecting academic performance has drawn attention to the role of classroom temperature in shaping student concentration. This study addresses the question: *How do variations in classroom temperature influence the cognitive focus of students, and what is the optimal thermal condition for learning?* Previous research has suggested a relationship between temperature and academic performance; however, many studies have relied on anecdotal evidence or lacked controlled experimental conditions. Furthermore, these studies have not effectively separated the influence of temperature from other variables such as lighting and noise, limiting the clarity of their conclusions. This gap highlights the necessity for a more precise and empirically grounded analysis. This research utilized an experimental method involving three controlled classroom temperature conditions: 16°C, 20°C, and 24°C. Participants completed standardized concentration tasks under each condition. The study applied a game theory framework to interpret behavioral patterns and identify strategic responses to thermal discomfort. Quantitative data were collected and analyzed to determine performance outcomes under each temperature scenario. Results revealed that student concentration peaked at 20°C, while both lower (16°C) and higher (24°C) temperatures were associated with decreased performance. These findings suggest that thermal comfort significantly influences cognitive engagement, with moderate temperatures fostering the most favorable learning conditions. The study underscores the importance of maintaining optimal environmental conditions in educational settings to support student well-being and academic success.

**Keywords:** classroom temperature, student concentration, cognitive performance, game theory, learning environment, thermal comfort