The University of Georgia

**Influence of the School Facility on Student Achievement:**

**Thermal Environment**

Much insight has been gained through scientific studies about the thermal environment of a school building and its relation to learning. Many studies have revealed that the thermal environment in the classroom will affect the ability of students to grasp instruction. Herrington (1952) found that temperatures above 80 degrees tend to produce harmful physiological effects that decrease work efficiency and output. Furthermore, Herrington also explained that poor ventilation interferes with heat loss from body surfaces produced from the effects of temperature, humidity and air movement. Manning and Olsen (1964), in their study, concluded that air condition was considered to be the most critical factor in providing an optimum thermal environment for learning. Peccolo (1962) noted that ideal thermal classroom environments had an effect on the mental efficiency of students especially in situations where students were performing clerical tasks calling for quick recognition and response. Thus, he supported a maintenance of an ideal temperature range for higher achievement. In relation to mental efficiency and thermal conditions, Canter (1976) found that human beings work most efficiently at psychomotor tasks when the environment is at a comfortable temperature.

Based on a survey given to teachers, McDonald (1960) concluded that classroom conditions improved by air conditioning included reduced annoyances, improved visual display and flexibility, and comfortable conditions. Teachers' attitudes and work patterns were significantly improved due to less fatigue. Likewise, student performance, attitude, and behavior improved in proper air conditioned climates making it easier to concentrate and making them feel less drowsy and fatigued. Nolan (1960) reported that higher temperatures have a negative relationship with academic learning. In relation to this finding, McCardle (1966) discovered that students in an ideal thermal environment made significantly fewer errors on tasks and required less time to complete the tasks than students in regularly controlled thermal environments. Stuart and Curtis (1964) reported greater gains in academic achievement of students in climate controlled schools as opposed to those students in non-climate controlled schools.

The New York State Commission on Ventilation (1931) conducted major investigations into the physiological and psychological reactions to various atmospheric conditions by school children in classroom settings. Some of their findings showed that temperatures above 75 degrees produced such harmful effects as increased respiration, decreased amount of physical work, and conditions favorable to disease. Thus, G.T. Palmer and T.J. Diffield recommended that schools maintain room temperatures between 68 degrees and 70 degrees Farenheight with sufficient air movement to eliminate objectionable odors and to avoid excessive drafts. In the area of temperature and humidification, King and Marans (1979) concluded that as temperature and humidity increased, achievement and task performance deteriorated, attention spans decreased, and students reported greater discomfort. Cooler classrooms created increased feelings of comfort, activity and productivity. Green (1979) determined that proper humidification in schools helps to reduce absenteeism as well as the spread of infection from child to child and child to teacher or parents.
Conclusion: The overwhelming weight of the evidence from the research reviewed in this summary supports the hypothesis that the thermal environment affects academic achievement at various grade levels within the school.

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