



INVESTIGATION OF CLIMATIC AND VISUAL COMFORT LEVELS IN HISTORIC ELEMENTARY SCHOOL BUILDING IN KOCAELI-TURKEY

Neslihan Türkmenoğlu Bayraktar and Mohammed S. G. Abusamhadana

Kocaeli University, Turkey

This study was undertaken to betray the thermal and visual comfort levels in historic elementary school building in İzmit-Turkey as they are very important environmental issues for children as effecting all their behavioral and mental performance during their learning period in school.

Most of the time the benefits from passive climatic and lighting strategies collide as the requirements of visual and thermal comfort criteria differ from each other in historic buildings because of the design strategies like high windows on facades which are constructed in order to benefit from daylight and cause unwanted heat gains in summer, heat losses in the winter period. The amount of energy consumptions and also the amount and the way of interventions for increasing energy efficiency of this kind of buildings have to be determined. But one of the most important strategies during this process is providing energy efficiency while also considering climatic, visual and acoustical comfort requirements of students and teachers who are the main occupants of school buildings.

In this context, a field study compromising climatic measurements and surveys implemented to children had been conducted in historic 'Ulugazi elementary school' in Kocaeli-Turkey, which is under the effect of temperate-humid climatic conditions. The survey was performed by implementing questionnaire to 40 students in two classrooms, located on North and South orientations of the building, concurrently by implementation of measurements as interior and outside temperature, relative humidity, interior air velocity and lighting levels. Questionnaire included questions on personal information as age and sex, student's sensation of the indoor climate, indoor air quality and visual environment during the measurement process. The following criteria were considered and asked for the students in the questionnaires to be marked as the individual appropriate scale of sensation during survey and measurements; Thermal sensation scale, thermal satisfaction scale, thermal preference scale, ventilation sensation scale, ventilation preference scale, air quality satisfaction scale, lighting sensation scale, lighting satisfaction scale, lighting preference scale.

According to the temperature and relative humidity measurements in classroom-1 and 2 average values of 26.3 C° in classroom 1, 25.5 C° in classroom-2 were obtained. Average relative humidity levels and humidity seems to be very near but outside the defined comfort zone. %70 of the students in classroom-1 located on south orientation denoted in questionnaires conducted concurrently with measurements that they were not satisfied with the thermal environment. %50 of the students wanted the classroom to be colder. %45 of them wanted no change in climatic conditions. %45 of the students in classroom-2 located on north orientation denoted in questionnaires conducted concurrently with measurements that they were not satisfied with the thermal environment. %40 of the students wanted the classroom to be colder. %55 of them wanted no change in climatic conditions. Thermal comfort seems to be provided more than classroom-1 because of less direct penetration of solar radiation interiors. Also, %40 students voted that interior airflows were very stagnant. % 85 of the students

wanted increase in air movement. Lack of indoor air flow has a bad influence on both performance and health of pupils and teachers. %35 and %40 of students stated that they were not satisfied with air quality in their classrooms in the two classrooms.

Measurements show that average illumination levels differ from each other in every part of the classroom which means that illumination level is not distributed homogenously in the classrooms. The survey results also support this inference. Although there are windows on the 2 different walls of classroom1, %70 of the children wanted more daylight in the questionnaires.

So from the results of questionnaires, It is obviously seen that climatic and visual comfort criteria are not exactly provided satisfactorily in Ulugazi elementary school. Thermal and visual requirements of students and teachers should be considered during implementation of strategies for increasing energy efficiency of this historic existing building.

Keywords: Thermal comfort, Visual comfort, Elementary school buildings, Survey.