

# Architectural Pride and Environmental Prejudice: The effect of personal status, historical value, and indoor décor on occupants indoor environmental quality in offices

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*ABSTRACT: This paper reports on an important yet unexplored area of indoor comfort studies, the relationship between historical attributes of buildings, personal values, and indoor environmental quality (IEQ) of office spaces. For this study we employed a comparative case study design to assess environmental conditions and occupants' behavioral responses of a year-long IEQ assessment of office settings inside ten adaptively reused historical palaces in Cairo Egypt. These palaces were selected based on their historical value, indoor décor, and their common mixed-mode ventilation system. In addition to subjective IEQ evaluations by occupants, physical measurements of the settings' layout, temperature, relative humidity, lighting intensities, air flow rates, and noise levels of the indoor office spaces were recorded during both the winter and summer seasons respectively. Focused interviews, questionnaires, field notes and occupants' comfort diaries were used systematically to evaluate the occupants' response towards their office environmental quality. The results of this investigation support the proposition that latent and symbolic qualities of the environment such as pride, status, historical value, and indoor décor attributes affect the overall perceived physical qualities of the environment in offices and workspaces. The findings provide both substantive and context specific knowledge to aid engineers, architects, and planners interested in the study topic.*

*Keywords: Indoor Environmental Quality, Adaptive Re-use, Indoor Décor, Offices, Psychological Factors*

## INTRODUCTION

*Et l'ancienne maison,  
Je sens sa rousse tiédeur, Vient des sens à l'esprit.*

*(And the old house,  
I feel its russet warmth, comes from the senses of the mind)  
Poèmes, Jean Wahl.*

Over the past 30 years, research on thermal and indoor environmental quality (IEQ) has shown considerable growth and enrichment especially due to the multiple fields of science that have approached the topic from different perspectives [1, 2]. With the extended contribution of research from the fields of environmental psychology, ergonomics, and human factors, much attention has been paid to the effects of psychophysiological factors on thermal sensation and environmental quality in offices and work environments [3]. However, the relationships between indoor décor preferences, personal status/pride, and preference as functions of the physical and historical value of buildings have not yet been investigated [4]. This is because such factors are not easily replicated in experimental setting and possesses difficulty in their control when studied in quasi-experimental investigation and field studies.

To overcome the previously mentioned limitations, this study focused on indoor environmental quality as an outcome. Specifically, the study investigated a holistic approach to environmental quality and how it can be conceptualized, operationalized, and assessed through both physical measurements of the indoor environments and occupants' response towards them [5]. The office environment of ten adaptively re-used historical palaces in Cairo, Egypt--which present unique environments of rich historical, symbolic, and cultural attributes that are not typically available in contemporary offices--provided an ideal context where the proposed research problem can be tested and evaluated. The palaces were built between 1860's and 1930's with different stylistic and historical values. They have gone through different degrees of transformations to accommodate office functions that range from historical preservation to complete remodelling. This range provided a good setting to investigate the research topic.

The study employed a systemic multi-disciplinary perspective to compare environmental quality and indoor comfort inside these palaces during 12-months of field research (Figure 1). The basic assumption that the research builds upon is that the quality of the environment is conceived as a system of interactions

between the individual (occupant) and his/her environment (building). This system of interactions affects people's behavior, experience in their settings, as well as other organizational outcomes such as occupants' productivity, health, and well-being.

### SUBJECTIVE ATRIBUTES OF THE PHYSICAL ENVIRONMENT AND OCCUPANTS COMFORT

A basic assumption held by corporate architects is the limited impact of the building on human behavior in general and human performance in particular [2]. With the growing importance of office work and its settings much attention has been placed on the psychological needs and well being of its users [7]. However, due to their limited focus on occupants' satisfaction with their physical work environment, previous studies did not conduct an intensive inventory of the physical qualities of the environment under investigation. For example, the relationship between environmental quality and indoor colors [9]; indoor decor and aesthetics [10, 11]; building age, history, and architectural style [12, 13, 14] were not considered comprehensively in earlier investigations (see [1] for a comprehensive literature review of previous studies). Furthermore, the inter-relationships between these qualities are seldom acknowledged (for example the interactional effects of lighting quality and noise on the perception of thermal comfort). Most importantly, occupant's desires or the ways by which s/he adapt to, change, or control the environment are not explicitly investigated and left for speculation [15, 16, 17].

### QUESTIONS OF OCCUPANTS PRIDE AND PREJUDICE FOR IEQ

The exploratory nature of the proposed study started with the following four research questions:

- 1) How do symbolic qualities of the environment such as history and pride affect the occupants' use of space and their perception of environmental quality?
- 2) What is the value of the historical attributes of the studied palaces on occupants' perception of space function, use, and environmental quality?
- 3) What patterns arise when comparing objective measures of the environment and subjective evaluations of occupants inside the ten settings studied?
- 4) What are the mechanisms and systems of negotiations between the occupants and their environment to reach a level of comfort with their office environment?

### DEFFINING IEQ

The current bio-physical theories of indoor comfort, such as thermal and visual comfort adopt an environmentally deterministic perspective that only stresses the importance of the physical environment in the design of a comfortable indoor space. In real settings, especially those designed with passive systems, the occupant reacts to the overall ambiance of the environment resulting from the direct as well as the interactional effect of these components of environmental quality. The framework around which this paper is organized conceptualizes indoor environmental quality in the office setting as a system. The different levels of comfort that individuals experience through their senses will act as the sub-

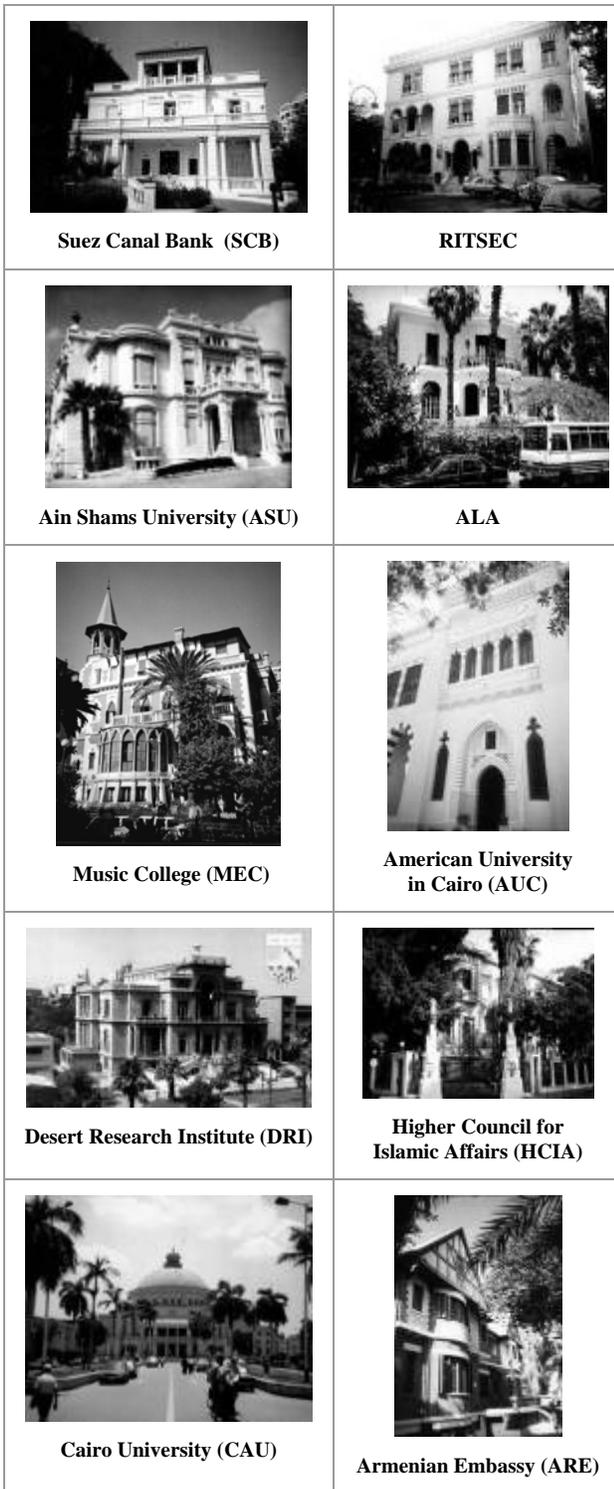


Figure 1: Ten Adaptively Re-used Settings in Cairo, Egypt

systems of the total indoor environmental quality in this proposed model (Figure 2). The individual's past experience and expectations represent his/her mechanisms of adaptation and habituation to the environment over time [15].

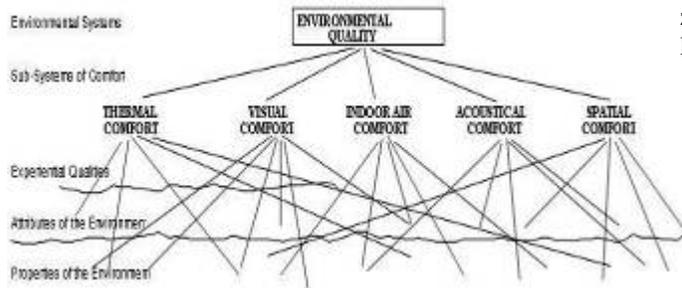


Figure 2: Indoor Environmental Quality System Model

### ASSESSING IEQ

The study used a comparative case study approach employing a systematic data collection procedure in each of the studied settings. The procedure was designed to investigate the relationship between indoor décor, historical architectural features, and personal factors such as pride, privacy, and status on the overall perception of indoor environmental quality (IEQ) as defined earlier. In each case study, the researcher employed a number of building measurements that included temperature, lighting levels, relative humidity, sound levels, ventilation rates, and spatial analysis of space metrics. The procedure was carried inside a theoretical sample of office spaces that fit with the studied goals and the research questions identified earlier.

In addition photographs, field notes, and interviews were conducted with the occupants during two weeks in the winter and summer respectively. These instruments were used to assess the occupants perception of IEQ on a seven point semantic differential scale (-3) to (+3) with a neutral (0) in the middle of the scale. Occupants filled out a research daily diary of their IEQ perceptions for the duration of the field measurements. This proved to be extremely helpful in the interviewing process and provided qualitative input to support the quantitative data gathered from the different office settings. The comparative case study design collected field data “in-parallel” for the ten settings studied. These instruments led to both quantitative and qualitative data sets to achieve triangulation in the data and identify different ways through which the phenomena under study are being seen. The data collected using this design was later analyzed and coded to elicit the relationships studied and to answer the research questions identified earlier.

### RELATIONSHIP BETWEEN AMBIENT COMFORT, DÉCOR, AND HISTORICAL VALUE

Results from our environmental quality assessment show that well decorated offices, which possess historical

value and provided their employees with personal control were generally perceived to have a high ambient comfort and IEQ (Figures 3 & 4). Interestingly high environmental quality in highly decorated historical offices conditions were perceived even though their indoor measured temperatures were below the comfort zone of 22-25°C [19] and ambient light levels below 250 lux [20].

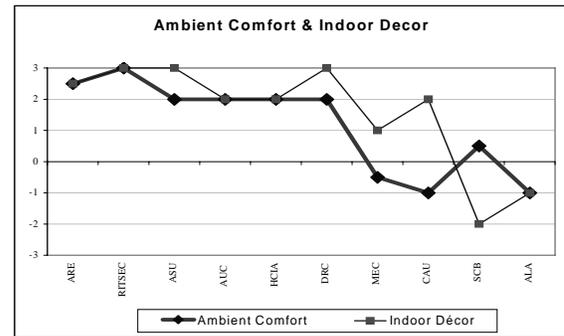


Figure 3: Relationship between ambient comfort and indoor office décor across the ten settings.

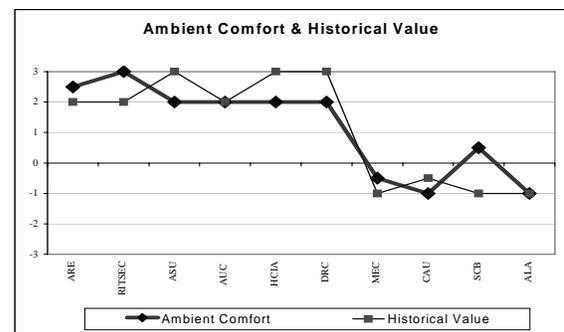


Figure 4: Relationship between ambient comfort and perceived historical value of the ten settings.

In addition to these general findings, occupants reported ambient comfort, historical value, indoor décor, and pride, as the most important positive attributes that adaptively re-used palaces provided. They also identified high ceilings, wide windows, thick walls, non-institutional décor, historical features, and luxurious interior to be symbols of high status. These properties were highly associated with classifying the place as a “high quality environment.” For example palaces that had high ceilings and thick walls were perceived to have higher ambient comfort than those with low ceilings and light partitions at the same measured indoor temperature and relative humidity. In addition, well-decorated palaces with high ceilings provided occupants with privacy, control, and spaciousness. This is due to the availability of ceiling’s patterns niches and alcoves in the spaces of these palaces that defined the territoriality of the occupants’ workspace and provided them with an opportunity to personalize their workspace.

Interestingly, office spaces with reported high historical value affected occupants' behavior and comfort levels inside them. For example, occupants reported that noise levels have decreased after they moved from a typical modern office space to their offices inside one of the palaces studied. According to one of the managers of the organizations, this was due to the "importance and respect the occupants have attributed to their new setting for its historical value" (interview #34, 7/2008). This was also indicated in the oral history narrated by the respondents as well as their higher sense of imagination for stories linking the physical properties and attributes of their settings with local historical events. In many cases these stories were detailed to the point where occupants could describe how original tenants used the palace in the past or where historical events took place.

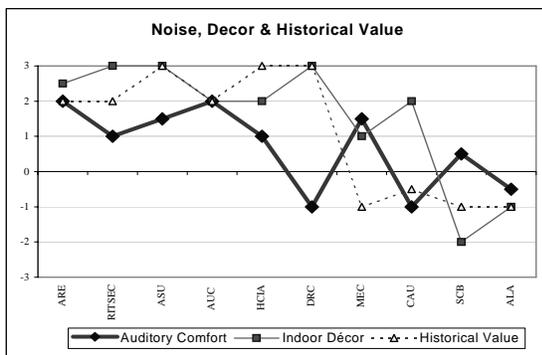


Figure 5: Relationship between indoor noise levels perceived, historical value of the settings studied.

Figure 6, compares the performance of three palaces; RITSEC, HCIA, and SCB with high, medium, and low perceived ambient comfort respectively. Astonishingly, measured indoor temperature and relative humidity across the three palaces are similar, averaging 21-26°C for temperature and 50-60% for relative humidity. What is remarkably different between the three palaces are other building properties such as high ceilings, wall thickness, amount of indoor decoration, and accessibility to operable windows, as well as other environmental qualities such as privacy, crowding, and perceived personal control. While RITSEC office halls have thick walls, high ceilings that could reach 6-7 meters, well decorated interiors, and large accessible operable windows, the SCB offices, on the contrary, are covered in modern wood panels, with dropped suspended ceiling tiles that reduce the room height to three meters, and most of its windows are non-operable for security purposes or blocked by partitions. This finding suggests that palaces where variables, such as ceiling height, windows, control and the availability of well perceived indoor décor had a better perception of thermal comfort. This might justify how occupants in offices that lie outside the zone of thermal comfort [19], can still experience it due to the existence of other variables that affect their thermal perceptions.

A similar comparison was conducted between another three palaces with similar perceived ambient comfort but different measured temperature and relative humidity. In Figure 7, while the AUC palace has a lower overall indoor temperature and relative humidity than ASU and DRC, their overall ambient comfort is similar due to the higher historical value and indoor décor of the ASU and DRC palaces, which positively contributed to their occupants' perception of high ambient comfort levels.

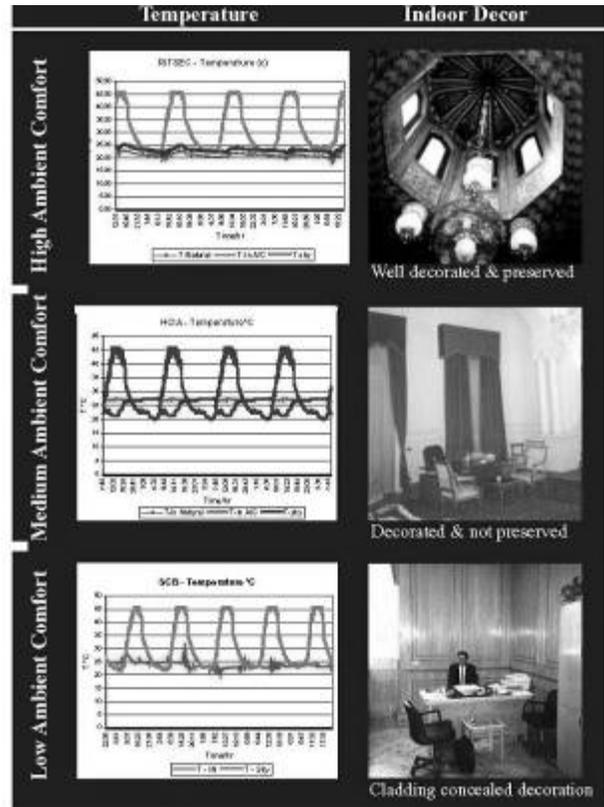


Figure 6: Comparison between three settings of similar recorded indoor climates but different perceived (IEQ)

### RELATIONSHIP BETWEEN HISTORICAL VALUE, STATUS, AND PERSONAL CONTROL

Three patterns representing the relationship between the historical value, status, and environmental quality inside historical palaces are concluded. These patterns might be culturally specific to Egyptians and are: *sulta* (power), *baraka* (blessings), and *ta'aioh* (habituation). Each one of these patterns represents a collection of properties and attributes in a setting that are linked together by a certain concept or a meaning of the built environment that is related to the culture of the occupants and is perceived on the level of the individual as well as teams and groups. These patterns can affect the occupants' perception, behavior, and attitudes towards their environment. The following paragraphs will explain each one of these patterns in more details.

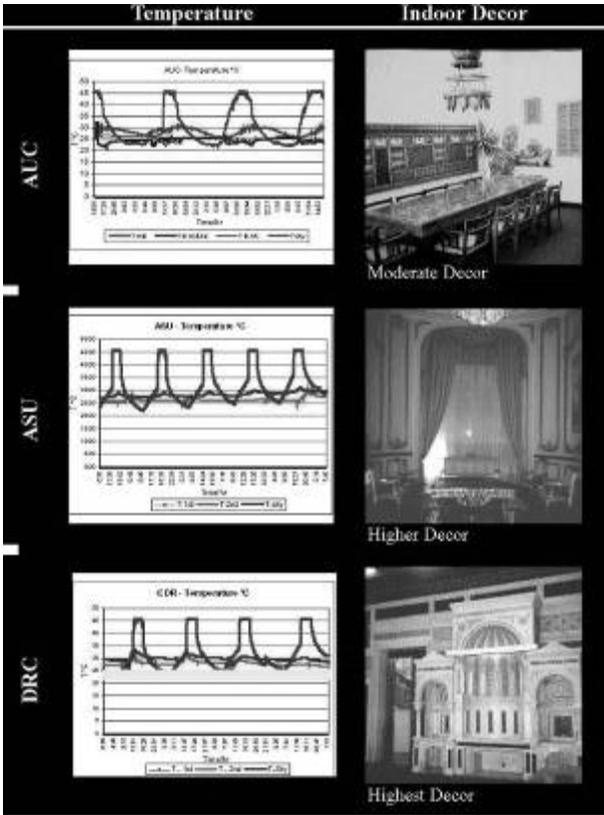


Figure 7: Comparison between three settings with similar perceived (IEQ) but different indoor recorded climates.

**Environmental Quality and Power — The concept of “sulṭa:”** Most adaptively re-used historical palaces belonged, or were occupied by influential, powerful, and sometimes political figures of some national or international importance. This fact made these palaces associated with power and status. The concept of “sulṭa”—in Arabic—represent a unique cultural construct that denotes power, pride, historical significance, and status which can be associated with leadership and the idea of ruling or being in control of a territory. One of the derivatives of the same verb is “sulṭan” meaning ruler or king. In the colloquial Egyptian language, the word is also associated with someone reaching a comfort stage or sitting relaxed and is expressed as “sitting like a sultan” or achieving status and comfort “a sultan in his own palace” (Figure 8 & 9).

An example of this pattern can be attributed to ASU and RITSEC palaces, which are highly ranked in terms of their total EQ. On the micro-level of the individual, the existence of crowns and alphabetical letters decorating the walls and door lintels of palaces provided occupants with a certain degree of status. The same is also true for those occupants of rooms where important historical events took place. On the mini-level of groups and teams, occupying spacious rooms with high ceilings and large windows provided the occupants with perceived spaciousness and a sense of pride. On the

macro and mega levels concerning the organization and its surrounding neighborhood the concept of *sulṭa* is demonstrated in the pride an organization take in occupying and restoring these palaces.

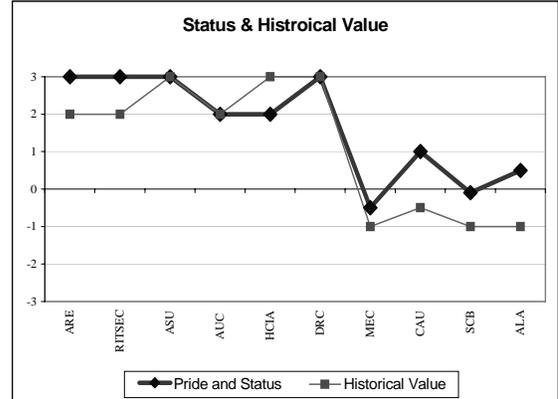


Figure 8: Relationship between historical value and status.

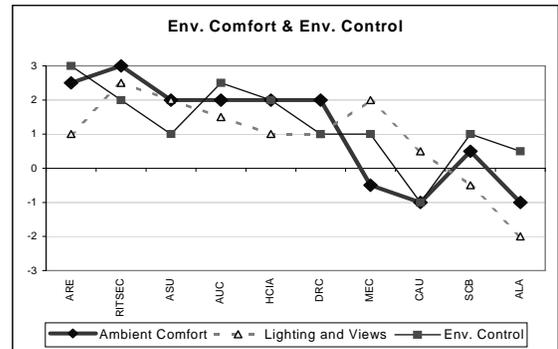


Figure 9: Relationship between environmental comfort and occupants' control.

**Environmental Quality and Blessings — The concept of “Baraka:”** Many adaptively re-used palaces were associated with important historical incidents and achievements that are meaningful to the occupants, their organizations, and society in general. These historical events are usually perceived as high-level meanings by the occupants, who associate the palace with “blessings” or being “a blessed place.” Many occupants have associated their placement to work in a former palace with high degree of status and achievement in an organization, especially in organizations that have a number of other contemporary office buildings located in the same company campus as the palace. The relocation of an occupant from a typical contemporary building to the palace was considered a blessing.

Other dimension of the concept of blessings is related to natural ventilation and building performance of these palaces. Naturally ventilated spaces are believed to be healthier and better than mechanically ventilated and air conditioned ones. Thus settings that were naturally ventilated were positively associated with blessings as well. On the group macro-level of analysis, blessings were attributed to well-decorated halls that had *Qur’an*

inscriptions, sculptures, and mouldings of angels on their walls and ceilings. These decorations were reported to reduce stress levels of occupants in these rooms.

**Environmental Quality and Habituation — The concept of “Ta’aiosh:”** Habituation, or its Arabic equivalent “*ta’aiosh*,” as a traditional Egyptian concept is a pattern that represents a number of positive qualities of the environment grouped together. These are the ability of the place to be adapted to the needs of the occupants, its flexibility, ability to control the occupied environment, and occupant participation in the transformation of their settings. In general, occupants who had the ability or were involved in decisions regarding the transformations of the palaces from their residential nature to a work environment were more satisfied with its environmental qualities.

On the organizational level of analysis, occupants’ involvement in decisions affecting their settings reflected the general organization’s policy as well as the willingness of the individual on the micro-level to participate in such activities. On the group mini-level, habituation was also a function of the occupants’ adaptation to the setting and its ability to offer functional opportunities and accommodate changes to match their needs. Historical settings with architectural elements, such as arches or alcoves, provided occupants with the ability to designate different functions within the same space.

### **ARCHITECTURAL PRIDE AN ENVIRONMENTAL PREJUDICE**

The data from this study reveals that environmental quality is not merely dependent on the supply of hot/cold air and sufficient lighting levels. It implies subjective measures related to the occupants’ feelings, behaviors, and the meanings they attach to their environment. Through the framework designed for this study, the results demonstrated that the occupants in the ten studied environments perceived environmental quality as a function of both the objective and subjective environments of their offices as well as their interaction.

The results of this investigation support the proposition that latent and symbolic qualities of the environment such as pride, status, historical value, and indoor décor attributes affect the overall perceived physical qualities of the physical environment in offices and workspaces. Occupants perceived a sense of pride in historical settings with well decorated interiors. This perception affected their overall sense of status to the degree that they were able to tolerate environments outside the comfort zones and norms. The fact that occupants were more comfortable in historical, well-decorated, that possess sufficient means of control, status, and have high ceilings is not a trivial point due to the energy and productivity implications of these factors

on office design and management. We hope designers acknowledge this hidden dimension of both subjective and symbolic attributes of the environment on occupants’ perceptions of indoor environmental quality in future office buildings. The findings provide both substantive and context specific knowledge to aid engineers, architects, and planners interested in the study topic.

### **REFERENCES**

1. Elzeyadi, I. (2002). Designing for Indoor Comfort: A systemic model for assessing occupant comfort in sustainable office buildings. Solar 2002 Proceedings, ASES National Solar Energy Conference, June 15-20, 2002 Reno, Nevada. CDrom.
2. Duffy, F. (2000), "Design and facilities management in a time of change", *Facilities*, Vol. 18 No.10/11/12, pp.371-5.
3. O’Neil, M. & Evans, G. (2000). Effects of workstation adjustability and training on stress and motivational performance. In E. Stamps: Building Bridges: Connecting People Research and Design. Proceedings of the annual meeting for the Environmental Design Research Association, San Francisco, CA. EDRA/ 31, pp.60-66.
4. Elzeyadi, I. (2003). Environmental Quality - Shaping Places for People: A Systemic Framework for Conceptualizing People and their Workplaces. In: *Shaping Places for People* pp. 71- 79. Proceedings of the Environmental Design Research Association EDRA 34th Conference. May 22-26, Minneapolis, Minnesota
5. Doxtater, D. (1994). *Architecture, Ritual Practice and Co-determination in the Swedish Office*. Aldenshot (UK): Avebury.
6. Gagliardi, P. ed. (1990). *Symbols and Artifacts: Views of the Corporate Landscape*. New York: Walter de Gruyter.
7. Mikellides, B. (1990). Color and Psychological Arousal. *Journal of Architecture and Planning Research*, 7:1, pp. 13-19.
8. Rohles, F. (1978). Temperature or Temperant: A Psychologist Look at Thermal Comfort. *ASHRAE Transactions*. Vol. (86), pp. 541-551.
9. Herzog, T. & Gale, T. (1996). Preference for Urban Buildings as a Function of Age and Nature Context. *Environment and Behavior*, 28:1, pp. 44-72.
10. Stamps, A. and Nasar, J. (1997). Design Review and Public Preferences: Effects of Geographical Location, Public Consensus, Sensation Seeking, and Architectural Styles. *Journal of Environmental Psychology*, 17, pp. 11-32.
11. Brager, G. and de Dear, R.J (2003) “Historical and cultural influences on comfort expectations.” Ch. 11 Cole, R. and Lorch, R. (eds) *Buildings, Culture and Environment: Informing Local and Global Practices*. (Blackwell: London), pp. 177-201.
12. Fisk, W.J. (2000). Health and productivity gains from better indoor environment and their relationship with building energy efficiency. *Annual Review of Energy and the Environment* 25:537-566.
13. Paciuk, M. (1990). The Role of Personal Control of the Environment in Thermal Comfort and Satisfaction at the workplace. In R. Selby (et al.). *Coming of age : EDRA 21/1990: proceedings of the Twenty-First Annual Conference of the Environmental Design Research Association, Champaign-Urbana, Illinois, April 6-9*.
14. ASHRAE, (2005). *ASHRAE Handbook of Fundamentals*. Atlanta: American Society of Heating , Air Conditioning, and Refrigerating Engineers, Inc.
15. IESNA (2008). *The IESNA Lighting Handbook: Reference & Application*. New York, NY: Illuminating Engineering Society of North America.