

Stamatina Th. Rassaia

Workplace Environmental Design in Architecture for Public Health

Impacts on Occupant
Space Use and Physical
Activity



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*I dedicate this book to my parents
Themistocles & Ninetta and my brother
Michael*

Preface

All fine architectural values are human values

Frank Lloyd Wright (1867–1959)

Walking is man's best medicine

Hippocrates (c. 460 BC–c. 370 BC)

Over the past few decades, studies in epidemiological, pathological, clinical, environmental and experimental fields of medicine have proved that physical inactivity represents a major contributor to many worldwide chronic diseases. Health-related research estimates that if this inactive lifestyle continues, currently healthy population will likely face a number of ailments and chronic diseases. It is suggested by health-related research studies that an increase of even 10% of population-wide daily physical activity levels would significantly benefit public health.

This research seeks to explore patterns of occupant physical activity and movement intensity within office buildings in the belief that office design substantially shapes the nature and frequency of intra-building activity. As the research expresses its statement of relations between activity and floor plans, it develops a vocabulary for describing a building layout's inducement of physical activity, designating for instance, spatial “attractors” and “rewards” for movement. This emphasis goes against the grain of current thinking regarding office layout, especially in the matter of IT (information technology) integration, which prioritizes the minimization of worker activity as a condition of workers' increased productivity.

In adopting health-related and social science monitoring techniques and calculations of human energy expenditure, this project draws on six data collections that involve direct observations, interview questionnaires, self-report diaries, accelerometer readings and wireless occupant location mapping. Exploring the relation between occupant activity within different buildings is diverse and complex as individuals and buildings may vary considerably. During this research, a number of challenges and limitations have been identified and are discussed in this book.

The novelty of this work is that it monitors free-living office environments and studies how architectural design may influence physical activity through *office task alone*.

In this research, statistical analysis of the data and a quantitative model (named “KINESIS” after the Greek word for activity and movement) have been carried out to explore and identify dynamics of human space use and energy expenditure during work-time. The results of the data analysis focus on spatial factors of the office architecture which include the openness of a layout (i.e. open-plan or cellular), the distance between office spaces (e.g. an individual’s desk and the kitchen), the existence of stairs between office locations (e.g. individuals’ desk spaces and the toilet) and the window to wall area ratio of a space that may form a trip destination.

Each of the above-mentioned factors has been shown statistically to significantly influence occupants’ activity and energy expenditure. In agreement with the results of the statistical analysis, the KINESIS model demonstrates a new simple model which simulates the behavior of populations in a given office environment. The research also statistically tests design implementations and illustrates how levels of activity might significantly increase energy expenditure distributions over population levels, and consequently benefit public health, by architectural design alone.

This book is composed by the following parts:

Physical Activity and Disease: Theory and Practice sets out to demonstrate the relation between physical activity and the promotion of health. This includes presentation of the health-related approach associated with the increasingly sedentary lifestyles across the worldwide populations. It describes also how scientific research demonstrates the value of exploring the design for office site movement.

Space-use and the History of the Office Building represents an overview of the history of office architectural design from ancient to present times. Along with recent concepts, theories and practice, it also introduces ideas on how the workplace is currently changing and how it further develops to respond to the current trends in office working.

Research Methods introduces the reader to current methods of measuring and mapping movement in different environments and disciplines. Based on these, the methods selected for the purposes of this research are presented.

Identifying Influential Office Architectural Design Factors of Movement illustrates research data collection results on the basis of which statistical analysis is carried out. From this analysis a quantitative (KINESIS) model is designed.

Conclusion and further objectives are suggested in the final chapter of this book.

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