

From the Co-Guest Editors

Green Ergonomics

Sustainability issues are of concern at the national and international levels due to multiple factors such as the current energy crisis, climate change and global environmental concerns [1]. To address these issues, there has been significant growth in the area of sustainable development, including green building practices [1,2]. Sustainable development, including buildings, products, and technologies, can be defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs (p. 16)” [3]. In this common definition, sustainability is viewed as being comprised of environmental, economic and social dimensions, often conceptualized as three interrelated pillars.

To date, the primary focus of sustainability has been on energy conservation and related environmental impacts and only limited attention has been paid to the health and wellbeing of people as related to sustainable development [1,4–6]. A report issued by the Institute of Medicine (IOM) cited the need for an increased attention to the impact of green buildings on the health of occupants since people spend the majority of their time indoors [5,7,8]. The IOM report also states that there is limited research on the intersection of the “effects of climate change on human health in the indoor environment (S-3)” [5]. It has been implicitly assumed that integrating “green” strategies such as greater quantities of daylight and fewer air pollutant emissions from products will, *de facto*, lead to better occupant health. However evidence accumulating from post-occupancy studies suggests that this often may not be the case. In recognition of the fact that buildings should exist to provide comfortable and healthy conditions for occupants, the United States Green Building Council recently made a commitment to focusing on the relationship between human health and sustainable development, stating that “health will be the biggest driver in the green building space in the next 20 years (p. 6)” [6]. This broader human goal also recognizes that occupant

health is not only a product of good indoor environmental conditions but also of good ergonomic design, and the USGBC is promoting this through a specific Ergonomics Strategy credit in their Leadership in Energy and Environmental Design (LEED) v4 certification process.

In the field of ergonomics, there is also growing interest in the role ergonomics can play to enhance green initiatives to ensure all three pillars are met for a sustainable future. In July 2008 the International Ergonomics Association established a Technical Committee, “Human Factors and Sustainable Development”, to promote this area and there has been a growing body of work in this area, yet such work remains in its infancy. In 2013 the journal *Ergonomics* published a special issue on “Ergonomics and Sustainability” which assembled some of the first studies on this topic. Now this special issue brings together the latest work on this topic by exploring various areas of green ergonomics in nine articles on diverse topics and with an international perspective.

Two of the papers presented herein explore diverse aspects of green ergonomics from a conceptual approach. Corporate policies were examined by Bolis and colleagues for their consideration of sustainability and social responsibility, an important step for outlining the role of ergonomics in this arena. Pavlovic-Veselinovic presents a compelling argument for thoughtful incorporation of ergonomics into sustainable development to ensure that equal attention is given to all three pillars of sustainability. It is hoped that these conceptual pieces will help to broaden the view of green ergonomics.

This special issue also presents the findings from three research studies related to green ergonomics. Thatcher and Milner used a longitudinal study design to investigate the effects of working in green buildings as related to productivity, physical and psychological wellbeing, and also measured occupants’ percep-

tions of the environment. While the results were largely positive, there is clearly a need for future research in this area. Hedge and colleagues conducted a post occupancy evaluation of LEED certified buildings and found generally positive results as related to satisfaction, health and productivity, however persistent issues were identified and implications for the LEED rating system were discussed. Hua and Yang studied the impact of the physical environment on physical activity and job satisfaction. It is important to consider this relationship in the green building design process in order to promote a healthy and sustainable workforce. While LEED has yet to formally include credits that address physical activity, we predict that it is on the horizon along with other exciting prospects for HFE professionals. As recently stated in a 2013 report from The Summit on Green Building and Human Health, "We know these to be simple truths: Where we spend our time matters. Daylight matters. Good acoustics matter. Healthy materials matter. Fresh, clean air and water matter. Design that encourages movement matters. Access to local and healthy food matters. (p. 1)" [6].

Finally, this issue presents four unique case studies that are integral to our work in promoting green ergonomics within sustainable development. Lynch presents a case study that serves as a valuable resource as it examines an organization's success in achieving the LEED ergonomics credit in multiple projects. The additional case studies highlight integration of green ergonomics strategies into the hotel industry, the chemical cleaning process and a unique program for reusing scrap material.

From reading the assembled work it will be obvious that ergonomics and sustainable design share a common goal in the desire to create places that are comfortable, pleasurable and healthy. Together, these articles represent a springboard for future work that hopefully will see a closer alignment in the work of ergonomics and architects, designers and engineers, and other HFE professionals to create a brighter, sustainable future for all.

Guest Editors

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