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# Design for Sport

EDITED BY

ANXO CEREIJO ROIBÁS

*Principal User Experience Consultant, UK*

EMMANUEL STAMATAKIS

*University College London, UK*

&

KEN BLACK

*Independent Advisor, Inclusive Physical Activity &  
Sport, UK*

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# Introduction:

## The Case for Socially Responsible Design for Sports

*Anxo Roibás, Emmanuel Stamatakis, Ken Black*

Historically, sport has been mainly practised by gifted or passionate people. Propagation of the health and aesthetic benefits of being physically active, together with an increase (or better management) of leisure time, has resulted in a diffusion of sports practice in the contemporary world. Currently, there are more members in health and fitness clubs than ever and sport facilities became a not unusual element in many new planning developments. Paradoxically, participation in sports still remains relatively low overall in both the centre and the periphery<sup>1</sup> and there is substantial margin for improvement. In England, for example, approximately 50 per cent of men and about 55 per cent of women do not do any sports,<sup>2</sup> and these “no participation” figures are particularly high among certain population sub-groups, such as South Asian middle-aged women (80–95 per cent do not do any sports), men and women from lower socioeconomic groups (70–80 per cent), and individual with disabilities (90 per cent).

Increases in sport participation would improve the population’s physical and mental well-being and would drastically reduce chronic disease-driven costs for the health services around the world. At the same time, other benefits such as contribution to environmental sustainability, reduction of crime,

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1 Argentine economist Raúl Prebisch’s (1901–1986) resulting division of the world into the economic “centre”, consisting of industrialised nations such as the US, and the “periphery”, consisting of primary producers, remains used to this day.

2 E. Stamatakis, M. Chaudhury. (2008). “Temporal trends in adults’ sports participation patterns in England between 1997 and 2006: the Health Survey for England”. *British Journal of Sports Medicine*, 42, 601–08.

and social and economic progress in developing and post-disaster areas are becoming more and more critical.

“Sports” is a wide term that has been used in a different way in a variety of settings. The most common use of the term is to describe participation in exercise and other recreational physical activity. Health-related research and practice define physical activity as “any bodily movement that results in energy expenditure above the resting level” (for example, walking to work/shops, tidying up, washing up), exercise as “a subset of physical activity that is done in a planned in an organized manner” (for example, going for a run, going to the gym, swimming, cycling for fun/fitness), and sports as “sub-set of exercise that involves participation in competitive activities” (for example, playing football, golf, running a marathon). For the purposes of this book, we will be referring to “sports” to describe participation in any competitive or non-competitive exercise that is done in a planned and structured manner. Also, we will be using the terms exercising and practising sport in an indiscriminate way. Such a broad definition is in line with the UN Inter-Agency Task Force on Sport for Development that defines sports as:

*all forms of physical activity that contribute to physical fitness, mental well-being and social interaction. These include play, recreation, organized, casual or competitive sport; and indigenous sports or games.*

This book shows how social responsible design can contribute to make sport practice widespread in the general population, including disadvantaged and hard-to-reach groups. It also explores the economic and social wellbeing impact of this process as well as its challenges such as environmental sustainability. The book takes an international perspective and goes beyond design for sport in the developed world only. While the main benefit from expanding sports practice in developed societies would be reduction of chronic disease rates and social inclusion, in the developing world where political instability and conflict are more common sport can have other functions too, such as a means of post-disaster relief.

Interest in sports as a passive practice (that is, being a spectator) is universal, in both the geographical and the cultural sense. This is, in part, because watching sports has become incredibly easily accessible (mainly through the multiple media access-points). Alas, the same does not hold true for active participation in sports. Low active participation in sports is partly due to the fact that current

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sports-design concepts are addressed to those segments of the population that are relatively young and healthy, highly skilled and motivated, and in many cases at least moderately educated with a fair buying capacity. Therefore, designers face now the challenge of making sport practice more accessible, enjoyable, and safe for the entire population. This entails including minorities that have been traditionally excluded such as the elderly, the disabled, people living in deprived areas, people from lower socioeconomic strata, and certain minority ethnic and religious groups. As previously outlined, if sports participation in the general population is low, it is even more so for marginalized groups and discriminated individuals. For example, a recent survey conducted in the UK showed that where participation in physical activity stood at 21 per cent (those aged 16+), for disabled people this figure dropped to just under 9 per cent.<sup>3</sup> Another survey<sup>4</sup> found that sports participation among Pakistani and Bangladeshi women living in England is 16 per cent and 12 per cent, compared with 34 per cent among women in the general population. One of the challenges here is how to encourage and engage these groups of users in the sport practice aiming to increase their participation. In order to achieve this, the players in the sport value-creation chain – namely, product designers, interaction designers, communication and information designers, interior designers, policy designers, game designers, town planners, engineers and architects – need to go beyond the improvement of the performance and usability qualities of tools and gears, interactive devices and environments (sports facilities and playgrounds). They ought to work synergistically to enhance the holistic user-experience so that active participation in sports becomes an accessible and pleasurable option with clearly understood benefits for the participants.

Besides sensitizing the reader about this designers' duty towards sport practice, the book also aims to make him reflect on the aspect of sustainable and responsible design, the same sense of social responsibility that Papanek exposed in his *Design for the Real World*:<sup>5</sup>

*Before (in the good old days), if a person liked killing people, he had to become a general, purchase a coal mine or study nuclear physics. Today, industrial design has put murder in mass production basis. By designing criminally unsafe automobiles that kill or maim nearly*

3 Active People survey, Sport England. (2006). ([www.activepeoplesurvey.com](http://www.activepeoplesurvey.com))

4 The Health Survey for England. (2004). "The health of minority ethnic groups" (<http://www.ic.nhs.uk/pubs/healthsurvey2004ethnicfull>)

5 According to Papanek, "Much recent design has satisfied only evanescent wants and desires, while the genuine needs of man have often been neglected by the designer." Victor Papanek. (1971). *Design for the Real World: Human Ecology and Social Change*. New York: Pantheon Books.

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*1 million people around the world each year, by creating a whole new species of permanent garbage to clutter up the landscape and by choosing materials and processes that pollute the air we breathe, designers have become a dangerous breed. And the skills needed in these activities are carefully taught to young people.*

The scope of design for sport extends from the area of product design to other design fields such the environment (for example, adequate and accessible infrastructures, persuading systems),<sup>6</sup> interaction design (for example, user friendly performance and monitoring systems), communication design (for example, information and motivation campaigns) and policy (for example, legislation protecting green spaces and reducing taxes on sporting equipment or publicly-funded sport promotion campaigns).

This book explores how design in its broad sense can contribute to make sport practice widespread in the general population as well as among disadvantaged and hard-to-reach groups, and discusses, at the same time, the impact and challenges of this process. Finally, it investigates the broader impact of social responsible design for sport in terms of social wellbeing and economic development and environmental sustainability. The basis of the above is the importance of understanding people's needs and requirements in their real contexts. In fact, the context can discourage or encourage the practice of a sport. For example, some older people might feel embarrassed wearing in public a certain cycling outfit that has been clearly designed for youngsters. Also, for certain cultures it is considered inappropriate for women to exercise in the same environment with men and therefore they are excluded from practising sports in public facilities. In this sense, the book explains how design ethnography<sup>7</sup> avails of psychology, economics, sociology, geography and cultural studies to understand these users' background, cultural sensitivities and needs.

The book is structured to reflect the multi-disciplinary and cross-disciplinary nature of design for sport and its implications. In order to reinforce and support the topics, it also showcases some compelling sports-design case

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6 Captology is the study of computers as persuasive technologies. This includes the design, research, and analysis of interactive computing products created for the purpose of changing people's attitudes or behaviours (Stanford persuasive technology lab).

7 Design ethnography is "a way of understanding the particulars of daily life in such a way as to increase the success probability of a new product or service or, more appropriately, to reduce the probability of failure specifically due to a lack of understanding of the basic behaviours and frameworks of consumers". Tony Salvador, Genevieve Bell and Ken Anderson. (1999). "Design ethnography". *Design Management Journal*.

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studies. To put the issue of sport design in context, this book gives an account of the evolution of sport practice, and other health or appearance-promoting leisure-time physical activity and exercise. Thereafter it covers different crucial aspects of socially responsible design for sport such as product, interface and information design, game (rules) and environment design to improve sport accessibility (for example, taking into account gender requirements, disabilities, and economic and cultural factors).

Next there is an overview of the subjects that will be discussed in the chapters that will follow.

In *Chapter 1*, sports historian Malcolm MacLean provides a brief but acute background of modern sport and the role of design in this process. According to the author, sport's popular "historicization and attendant nostalgia" are responsible for the sense of crisis.

*At the same time, the perception that sport is something done by naturally occurring, organic, human bodies that use the universal skills such as running, jumping, and throwing conceals its artificiality, its design. If nothing else, analyses and interpretations of sports' design need continually to remember its artificiality, and the paradox of its greatest moments being in its state of continuous contemporary decline.*

*Chapter 2* shows how information technology can help to make sport practice easier (for example, GPS maps and locator, personalized virtual trainer, personalized diet, and so on), more enjoyable (for example, by providing information and awareness about the users' environment and their social surroundings, audiovisual entertainment on the go, and so on) and more effective and safer (for example, performance- and health-monitoring). Interaction design experts Floyd Mueller and Stefan Agamanolis also present their work around the concept of "Exertion Interfaces" looking at supporting designers in creating systems that motivate people to exercise and incorporate regular fitness activities in their lives. They also present some novel sports experiences related to interactive systems, and highlight the role of social support in these activities (for example, availing of social networking advances). Finally, the chapter describes remaining issues and opportunities in order to advance further the field of design for sports from an interaction design perspective.

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*Chapter 3* addresses the topic of urban planning design to sustain sport practice. Koberstein and Bergmann explain how sport can promote the social and ethnic integration of a district's inhabitants: suitable sports sites, "activity spaces" as well as an improvement of the sports offering are essential conditions for social cohesion in a town. The demands of young people for sports facilities and sports offerings have changed substantially over recent years. However, they also point out that traditional sports sites often no longer fit the needs of new generations. According to their extensive experience in the area mainly during the reconstruction of East Germany, unconditional access to sport (particularly in deprived districts) should be a right and one developed in partnership with the inhabitants. The presented model of demand for the integration of sports development in urban planning in East German local authority districts can be easily applied by other realities even if not evidencing comparable socio-economic patterns.

*Chapter 4* focuses on the links between interior and environmental design and sport practice. In brief, Kat Martindale explains how the functional and operational issues in physical-space design can broaden opportunities for involvement in sporting activities. It also addresses the impact of designing safer neighbourhoods that encourage outdoor pursuits, enhance perceived and factual security and sports participation contributing, at the same time, to reduce area deprivation and crime.

*Chapter 5* deals with the intricate issue of equipment and space design for disability. George Torrens and Ken Black elucidate how the growing self-advocacy movement, and increases in disability rights legislation in developed countries, has led to a rapid increase in accessible design. They also address how new sports facilities must now adhere to strict guidelines regarding the access of disabled people. The authors also illustrate how the influence of high-level sports events on environmental improvements and better access (for example, Athens Paralympics), and corresponding increased awareness that in turn have improved opportunities in sport for ordinary disabled people. They evidence how the evolution of equipment-design mirrors the way sport for disabled people has grown from a participation-based, impairment-specific approach to a multi-million euro elite sports programme, including the design of other sports equipment innovations. However, they contrast this with the continuing difficulties still faced by disabled people in developing and Third World environments.

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*Chapter 6* is focused on game design. Specifically, Ken Black and Doug Williamson demonstrate how legislation affecting the inclusion of young disabled people in physical education (PE) has had a positive influence on the development of resource material, equipment and activity-design to support professional staff in facilitating their inclusion. Examples of specific sports programmes targeting this group show how the modification of game design can provide vehicles for increased participation. At the other end of the spectrum, the disability sports programme has developed game activities to promote the involvement of specific populations, particularly those who have previously been excluded from “mainstream” sports activities. Finally, the growth of the Adapted Physical Activity “industry” has seen the increased involvement of academia with corresponding developments in undergraduate courses and accompanying career opportunities.

In *Chapter 7*, Robert Sands examines how compelling immersive user studies together with co-design methodologies can be successfully applied in the process of sport design to understand people’s needs in their specific contests in order to identify design requirements or to evaluate a design. As this chapter will explain, this approach is valuable to understand people’s background, identify realistic usage scenarios and collect users’ soft data such as their emotions and feelings towards the use of a particular product (or practice) in a specific physical and social environment. The ultimate scope is to enhance the quality of the overall user experience associated to sport practice. In addition to the users’ “soft” qualitative data above, high quality, objective and quantitative information about the movement (including positions of segments of the body, position of the centre of mass, joint angles, weight distribution, linear and angular velocities and linear and angular accelerations) and forces acting on an athlete is essential for optimizing the design of equipment and reducing associated injury risks.

In *Chapter 8*, James Shippen shows how an accurate and objective biomechanical data-capture and analysis has straightforward applications in the design of sporting equipment. With reliable, reproducible biomechanical information it is now possible to incorporate this information into the sport design process. This chapter reviews instrumentation and techniques used for such biomechanical analyses which became decisive information to build the requirements for sport design.

In *Chapter 9*, Gary Armstrong, Emmanuel Stamatakis and Natalie Campbell refer to the sporting legacy of major sporting events, and in particular,

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the Olympics as a means of expanding sport-participation in the general population. As the author says, it is perhaps naive to believe that such a legacy will be a natural consequence of the euphoria associated with the winning bids and Olympic athletic successes. And although there is no evidence to suggest that people will be inspired by the successes of sporting heroes and the glamour of Olympic shows, the dominant sports development model in developed countries are built upon these assumptions. Socially responsible sports-development models are those that do not advocate heavy focus on the top elite athletes only. Instead, what is needed is a well-funded, carefully thought-out and socially responsible policy design that is based on the needs of the wider society and the available evidence.

*Chapter 10* is devoted to policy design. In specific, Katrin Koenen retains that sport can be used in development programmes and in humanitarian programmes for post-disaster intervention. Doing this, she shows an acute approach to the topic of social wellbeing and economic development through sports. She also takes a position on issues related to the social responsibility of product and environmental design for developing countries (for example, sustainability and recycling, the use of local resources and materials, and so on).

*Chapter 11* discusses the relevance of sport-related campaigns and policies designed and implemented by the United Nations. Gary Armstrong and Holly Collison offer insights into how such schemes are justified, implemented and evaluated and they question current UN practices in this area.

This book represents a unique and comprehensive approach to design that embraces several key design categories. A number of renowned contributors in several areas discuss topical issues around design for sports. The book is intended to provide a valuable material to be used both for teaching purposes – in undergraduate and postgraduate courses dealing with the design of sport gear, systems and environments – and practitioners – that need concrete materials to understand the user-experiences in social practices and to evaluate the applications used and combined. It is addressed to educators and researchers in sport, project managers working in the sport industry, product designers, human factors practitioners, interface evaluators and HCI designers, interior designers, information designers, communication designers, game designers, trends sociologists, journalists, architects, policy-makers and engineers. The book could also be used in any curriculum related to social responsibility and sustainability that include communication and information systems in its

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