



Research on social and humanistic needs in planning and construction of green buildings



Fen Li^{a,*}, Tao Yan^a, Junyue Liu^a, Yupei Lai^a, Sandra Uthes^b,
Yuanyuan Lu^a, Yingqian Long^a

^a Shenzhen Institute of Building Research Co. Ltd. Meiao 3 road, Shangmeilin street, Shenzhen, P.R. China

^b Leibniz-Centre for Agricultural Landscape Research (ZALF), Eberswalder Strasse 84, Müncheberg, Germany

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ABSTRACT

Green building refers to a structure and using process that environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation and demolition. In the period of the 12th five-year plan (2011–2015), China's green building develops toward regionalization and scale expansion. Based on a questionnaire ($n = 137$) among groups of different income and social status combined with statistical analysis, This article aims at analyzing and understanding the social and humanistic needs that should be taken into account when planning and constructing green buildings, s. The results include: (1) compiled a list of the social and humanistic needs for the planning of green buildings, including architectural mixed style, green residential space, public open space, and public supporting facilities; (2) Chinese social and humanistic needs should focus on convenient services facilities and public services, compatibility between buildings and the surrounding environment, a rational house layout and function, as well as the urban green land's adaptability to local climate; (3) independent from their income levels, the respondents showed acceptance for green buildings' incremental costs; (4) house design and function should meet the green connotations including lighting, ventilation, energy conservation etc., and also give full consideration to the development and reserved space for future building renovation. Meanwhile, house design and function should have well-balanced various house styles, address the needs of people at different levels, and make house units more diversified. These results aim at providing decision making basis for large-scale development of green buildings.

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1. Introduction

In the 1960s, Italian-American architect Paolo Soleri invented the concept of “arcology”, which, combining “architecture” and “ecology”, also refers to “green building” (Zhang, 2011). Green buildings are about efficiently using energy, water and other resources; protecting occupant health and improving employee productivity; reducing waste, pollution and environmental degradation. Theoretical research in arcology has become increasingly mature over the past 40 years. In recent years, such research in China and overseas tends to focus on evaluation and system research of green buildings, cost effectiveness, analysis of relevant policy and institution, full-life-cycle assessment on green economy, development and management research, and construction management (Chau, Tse, & Chung, 2010; Issa, Rankin, & Christian, 2010;

Ross, López-Alcalá, & Small, 2007; Q. Ye, 2009; Z.D. Ye, 2012; Alyami & Rezgui, 2012). Since 1990s, there has been extensive development of developing standards and rating systems to allow for assessing the environmental performance of green buildings, many of which have subsequently gained considerable success (CASBEE, 2011; Cole & Larsson, 2002; Laustsen and Lorenzen, 2003; Mao, Lu, & Li, 2009), such as the BRE Environmental Assessment Method (BREEAM) in the UK, the US rating system “Leadership in Energy and Environmental Design” (LEED), or the Comprehensive Assessment System for Built Environment Efficiency (CASBEE) in Japan. In China, the *Evaluation Standard for Green Building* has been released and carried out based on abroad assessment systems, and subsequent technological details have been issued to optimize the standard. Using this standard, research on green technologies and application of new technologies, such as solar energy technology, selection of green materials and green construction, is now in progress (Bao & Wang, 2010; S.Q. Chen, 2009; Z.G. Chen, Xu, & Shen, 2011; Li, Wu, & Li, 2012; Liu, Luo, & Yan, 2009; Luo, Yang, & Yan, 2010).

* Corresponding author. Tel.: +86 10 13810488831; fax: +86 10 82248320.
E-mail address: lifen009@126.com (F. Li).

The development of green buildings extends the range of architecture from the buildings that house people to the entire environment where people live, from modern peoples' demands for buildings to the development space for future human beings, from combination of functionalities and forms to harmonious development of humanity, resource and environment. Therefore, social and humanistic needs are quite important when planning green buildings. Some scholars put forward that research on humanistic needs for green buildings will help resolve problems arising from fast-growing urbanization, such as featureless community environment, indifferent interpersonal relationships, unattended old people and children, few social contact and participation of citizens, etc. The concept of green buildings stresses on traffic connectivity of traditional neighboring communities and convenience of various service facilities, and integrates humanistic ideas throughout planning theories (Appleyard, 1981; Jacobs, 1961; Deakina & Reid, 2014).

A method for assessing the quality of public spaces and public life is the Public Space & Public Life Survey (PSPL), developed by the Danish urban designer Jan Gehl and his team (Gehl & Gemzoe, 1996). PSPL examines how urban public space is being used and what human activities carried out in these spaces, and studies urban residents' demand of public facilities and living quality through questionnaire, city mapping, and observation etc. At present, PSPL has been applied in a number of case studies including London, Melbourne, Sydney, Perth, Seattle and other cities around the world (London, 2004; Melbourne, 2004; Perth, 2009; Seattle, 2009; Sydney, 2009; Zhao, Yang, & Liu, 2012). Khalil (2012) studied the strategic plan of two cities in Egypt to review how stakeholders prioritize projects according to what contributes in improving their quality of life. The article shows that the strategic plan for a city has to integrate various priority projects and actions to enhance a better quality of life for inhabitants according to their human and social needs (Khalil, 2012; see also Cummins, Eckersley, Pallant, Vugt, & Misajon, 2003).

Therefore, architectural planners have gradually realized that green buildings are not just independent individuals. When the scope extends to community, residents' social and humanistic needs can be met in a better manner if facilities, public space and traffic were under rational planning and construction. Advanced architectural planning mostly attaches great importance to assessment and analysis of public elements such as society and humanity. It emphasizes on public participation, of which, effective implementation can be ensured through legislation. In contrast, social and humanistic needs for architectural planning in China are mostly accompanied with the planning of livable buildings, ecological cities and communities. Moreover, public participation is often only a formality; and the social and humanistic research on green buildings is still at an early stage.

This article aims at identifying the social and humanistic needs that have to be taken into account by Chinese planners and decision makers, when planning and constructing green buildings. Social and humanistic needs depend on the availability of resources and its consistency, including health, education and traditional culture, income generation and environment. Therefore, a questionnaire survey was conducted, involving consideration of architectural style, heating and green of residential space, different populations' demands of public space, the need to improve public facilities. The results are expected to provide a basis for decision making regarding the large-scale development of green buildings.

2. Research method and data source

We adopted two methods including literature survey and questionnaire in this article. The general objective of the questionnaire

was to research residents' needs for hardware facilities in green residence communities and spiritual needs for leisure life and recreation to unveil social and humanistic needs that should be taken into account when planning and constructing green communities. To this end, participants of the 9th Green Building Conference and 2013 City and Development Planning Conference held, respectively, in Beijing and Zhuhai in April and July 2013 were surveyed. The interviewees were designers, consultants, managers engaging in urban planning, architecture, management, municipal administration, engineering and transportation respectively at universities, research institutes, government sectors or companies. All participants had rich experience and good understanding of green buildings, providing first-hand and effective data reference for researching humanistic needs for planning green buildings. In total, 131 fully answered questionnaires could be obtained and were analyzed with the software package SPSS 18.0.

Public Spaces and Public Life (PSPL) is a research method used by Jan Gehl, a Danish architect, in his study "Public Spaces and Public Life". This method based on quantitative and qualitative analysis (map marker, counting, observation, interview and questionnaire etc.) can help us understand the behavior and the activities of the people in the public spaces, which provides useful basis for the design and reconstruction of the public spaces. Based on a questionnaire research using Jan Gehl's method, we design a quantitative approach to measure the humanistic needs of different groups with different social status from 4 perspectives including mix of architectural styles, green residential space, public service facilities and cultural demand.

The questionnaire included three sections:

- the first section included basic information about the interviewees, including professional background, gender, age, total family income, occupation and education degree, which was set not only for a basic understanding of the interviewee, but also for reflecting social factors and external factors that may influence their needs;
- the second section was about social and humanistic needs that should be met in daily life and leisure time; and
- the third section was about factors that should be involved in the social and humanistic needs, such as architectural styles, requirements for green residential space, and public service facilities, etc.

In order to receive comprehensive, accurate, reliable results, the questionnaires were carried out with close-ended and semi-open design. Considering that the options may not cover all situations about the interviewees, semi-open questions were set to know more information. Besides, the questionnaire included serial and scaled questions. Option setting was based on existing livable community assessment system and the results of pre-survey on social and humanistic needs for planning and construction of green buildings.

3. Results

3.1. Background of social and humanistic needs

3.1.1. Basic information analysis

The sample consisted of 78 men (59%) and 53 women (40%), which show a balance between male and female and the samples are representative when it comes to the gender (Table 1). The average age of the participants is 34, among them, and the majority was between 20 and 40 years old (76%), 14% belonged to the age group 40–50 years. Our sample is made of conference participants including experts, managers etc. They are chosen because they are

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