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RESEARCH ARTICLE

“Wheelchair slow transit” system-based elderly auxiliary travel mode



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Received 13 October 2014; received in revised form 29 May 2015; accepted 10 June 2015

KEYWORDS

The elderly;
Auxiliary travel mode;
“Wheelchair slow
transit” system

Abstract

Based on research of the current situation and analysis result of a case study in the Nanjing region, this paper proposes a “wheelchair slow transit”(WST) system-based elderly auxiliary travel mode. The system involves three fundamental composition frames, namely, support, transit components, and connection components. Each component is designed as an armrest, ground track, or vertical type to respond to actual demands. Thus, this system may be adaptable to diverse conditions. Taking Xiangpuying community as a case study, the author examined the application of the WST auxiliary mode in particular communities. The WST system helps to increase the accessibility of existing public areas, creates a safe community traffic environment, improves municipal facilities, and strengthens universal design. The study intends to provide a reference to obtain a complete aged care design and to build a comfortable and livable aged care community environment.

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1. Introduction

The rapid growth of the aging population has become a global problem in the twenty-first century. The current number of the elderly over 65 years old worldwide has already exceeded 342 million, and this value is expected to double by the year 2020 at 722 million (Fujiwara et al., 2000; Murayama et al., 2012). The number of senior citizens has increased with improved medical conditions and life

quality, especially in developed countries (Courtney et al., 1997; Mullan and Budger, 2007; Nachreiner et al., 2007).

Currently, among the 1.36 billion people in China, the elderly population aged more than 60 years old reached 194 million in 2014 and will increase continuously in the future. The elderly population of China is the largest in the world and has an extraordinarily rapid growth rate. From 2001-2020 and 2021-2050, China's aging population is expected to grow at a rate of 5.96 and 6.2 million/year, respectively. By 2050, the elderly population will reach 400 million, which accounts for 30% of the total population (China Municipal Committee for Aging People, 2011; Kinsella and Wan, 2009; O'Neil et al., 2010). Thus, care for the elderly has become a great challenge in China.

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Peer review under responsibility of Southeast University.

<http://dx.doi.org/10.1016/j.foar.2015.06.003>

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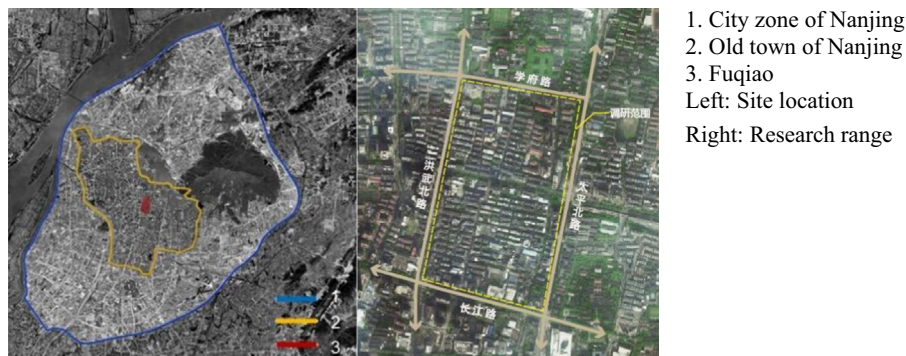


Figure 1 Research area.

Source: Google Maps and drawn by the author.

As society shows increasing concern about the issue of aged care, several countermeasures that aim to enhance aged care environment have been developed recently. Among these countermeasures, studies on aged care strategy at the urban community level have the most significant effect on improving the daily life environment quality of the aged population. In a number of newly-built aged care communities, auxiliary facilities and barrier-free access are designed for the elderly in public buildings, traffic roads, and outdoor environment. However, in the majority of the existing communities, poorly designed infrastructures result in considerable inconvenience to the daily life of the elderly. Thus, to address the issue of aged care, this paper discusses practical problems and solutions concerning the daily lives of senior citizens.

2. Survey on the current travel situation of the elderly

To determine the real-life status and travel demand of the elderly, a field study was conducted in Fuqiao, Nanjing. Fuqiao is located in the old city of Nanjing and is composed of numerous old communities. Unlike new communities, the old communities are largely inhabited by senior citizens.

Fuqiao has a total area of 600,000 m² and is bounded by Xuefu Road, Changjiang Road, Hongwu North Road, and Taiping North Road. Fuqiao accommodates 36 communities, most of which were built before the 1990s. They are relatively shabby and are occupied by a large number of senior citizens. This study focuses on the present situation of the community environment, the daily activity content of the elderly, and their travel modes (Figure 1).

2.1. Daily travel modes of the elderly

Physically healthy senior citizens tend to walk for a relatively short distance or carry foldable stools to enable them to rest during long-distance walking. Disabled senior citizens depend on auxiliary facilities for activity, and the use of wheelchairs is currently the most popular option. The number of elderly people aged 60 years old and above will reach 1.31 million by 2015, with disabled elders accounting for 89,500,¹ which is as

high as seven percent of the total elderly population. Thus, a considerable number of old people need wheelchairs to perform daily tasks. Given that all aged people climb ladders, virtually all elderly will eventually have to rely on wheelchairs, in whole or in part, as their physical strength declines gradually. Thus, traveling via wheelchair is a common daily travel mode for senior citizens.

2.2. Independent travel demand of the elderly

Studies have shown that street corners of communities, civil squares by the river, and public parks are popular venues in which the elderly perform social activities (Figure 2). The elderly generally maintain excellent body conditions and are fond of such activities. Moreover, many aged people just sit by door steps to rest and bask in the sun (Figure 3). Most of these elderly are poor, and several are disabled and in dire need of wheelchairs. During an interview, they expressed their passion for outdoor activities, but also mention difficulty in getting around the confines of their activity areas.

In cities nowadays, children commonly work in distant locations, and an increasing number of aged parents are faced with the plight of an independent life. Outdoor activities are indispensable to senior citizens because they need to bask in the sun and must be exposed to fresh air to keep themselves fit through regular outdoor exercises. Their life demands can be satisfied through daily shopping, hanging out, and receiving medical advice, social identity, and psychological security through specific social activities. This finding shows that the elderly have a strong desire for independent travel. However, the travel activities of many disabled elders nowadays are limited because of poor health conditions.

2.3. Problems of wheelchair travel

As an auxiliary facility, the wheelchair is widely accepted by the aged group. However, its use gives rise to several problems.

- 1) Inconvenient operation: the wheelchair is operated through wheel rotation driven by arm power. Thus, using a wheelchair is laborious for the elderly, and they require aid during long-distance travel. As a result, traveling alone over a long distance can be difficult for old wheelchair users.

¹ifeng.com http://js.ifeng.com/news/province/detail_2015_02/09/3543144_0.shtml.

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