

Issues of Devices and Applications for Supporting Walking in Older People - Focus on the Information Provision

Fukuoka, Japan

Japan has become a super-aging society, with the number of older people (over the age of 65) at a historical high both in absolute number (33 million) and as a proportion of the total population (26.0%), where one in four individuals is elderly. As part of the aging process in people, a certain degree of deterioration in physical performance is inevitable. However, it is essential to minimize the degree of functional decline and maintain the ability to engage in daily activities without hindrance, and these are urgent topics in the era of the super-aging society.

For older people, exercise is essential to maintaining good health. According to a Ministry of Education, Culture, Sports, Science and Technology survey, the majority of people over the age of 60 replied “walking” in response to questions about the kinds of exercise they had performed in the previous twelve months, and the kinds of exercise that they would like to perform in future. Moreover, walking is known to be associated with positive psychological improvements, such as a subjective sense of wellbeing, life satisfaction and a sense of purpose in life, as well as improvements to physical and mental functioning, such as arm and leg muscle strength and standing balance.

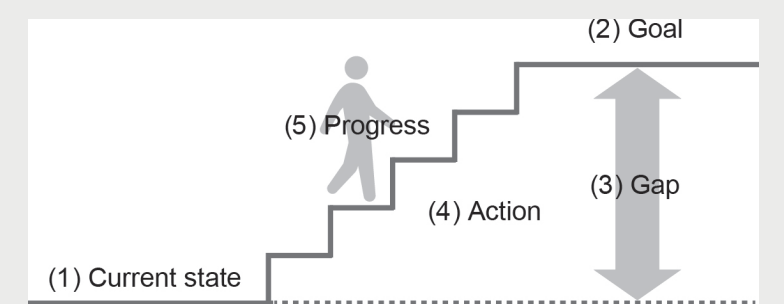
A wide range of products to assist walking have come onto the market in recent years, but relatively few have been targeted at older people. Accordingly, in this study we focus on information about the functions for assisting walking, comparing and contrasting the information provided for existing products that support walking with the goal of clarifying issues from an information-provision viewpoint.



Viewpoint of this study

In this study, we take “walking” to be an activity directed at a certain goal or ideal, focusing on the number of steps taken or the distance walked, for example. Thus, we carried out the research described below with reference to the visualization levels that have been identified in previous work in the management field.

These visualization levels are as follows (Figure 1). (1) Making the current situation visible, (2) making their goal visible, (3) the gap (or deviation) between the goal and the current situation, (4) establishing a specific action to reach the goal, and (5) making the progress toward the goal in the process of the activity visible. These levels are abbreviated below as (1) “current state,” (2) “goal,” (3) “gap,” (4) “action” and (5) “progress.”



Information required by older people

We conducted interviews with eight older people who go for walks on a daily basis, asking about their thoughts before, during and after walking. From these interviews, we obtained a total of 110 comments from the eight survey participants (Table 1).

We classified comments into three categories according to content: 1) 30 comments relating to the action of walking, such as A17, C7, D11, F17 and H8 ; 2) 35 comments relating to the circumstances surrounding the walk, such as B13 ; and 3) 45 comments not directly related to walking, such as E15 and G5. Accordingly, we decided to focus our subsequent considerations on the 30 comments related to the action of walking, as comments in alignment with the viewpoint of the study: walking as “an action directed at a certain goal or ideal.”

We first examine which information items were required by the survey participants. We extracted seven types information item, which we broadly divided into items related to walking and items related to the body. Next we examined the information content required by the survey participants. We were able to extract six types of information content.

Table 1: List of subjects

Subject no.	Gender	Age	Walking course	Place	Date and time	Number of comment	Example of comment
A	Female	67	Park near her house	Fukuoka city	October 31, 2015 4p.m. - 5p.m.	18	I wonder how far I've walked so far (No.17).
B	Male	70	Around his house	Iiduka city	October 11, 2015 noon - 1p.m.	16	Tomorrow I might walk when it's a bit cooler (No.13).
C	Male	87	Around his house	Kitakyushu city	November 3, 2015 2p.m. - 3p.m.	13	I'm very thirsty (No.7).
D	Male	73	Around his house	Koga city	November 23, 2015 10a.m. - 11a.m.	12	I walked well today as usual (No.11).
E	Male	67	Park near his house	Koga city	November 23, 2015 noon - 1p.m.	15	I'm all sweaty. I'm going to have a shower (No.12).
F	Male	68	Park near his house	Fukuoka city	November 23, 2015 1p.m. - 2p.m.	19	Let's weigh and check the result of the walking (No.17).
G	Male	66	Park near his house	Fukuoka city	January 8, 2016 6a.m. - 7a.m.	8	Let's buy breakfast and go home (No.5).
H	Female	60	Around her house	Fukuoka city	January 9, 2016 2p.m. - 4p.m.	9	I feel tired of cardiopulmonary function when it is cold (No.8).

Information provided by existing products

Products that support walking can be classified into two types: dedicated devices and smartphone apps. The sample products for this investigation were chosen by conducting a web search with the keywords “walking & device” and “walking & app” and selecting the 11 devices and the 20 apps (Table 2 & 3).

We then investigated the functions of these devices and applications. We were able to identify 22 device functions and 23 app functions. Grouping similar functions, we classified functions into 24 different categories. Looking at these results, it appears that functions can be classified into (A) functions relating to the action of walking and (B) functions relating to the circumstances surrounding walking. Accordingly, we decided to focus on the 20 functions in the (A) category (functions relating to the action of walking), which agrees with the viewpoint of this study as outlined earlier, namely, walking as “an activity directed at a certain goal or ideal.”

We started by considering what information items are provided by each of these functions. We were able to extract 5 types of information items, broadly divided into items related to walking and items related to the body. Next, we examined the information content provided by each function. We were able to extract 5 types of information content.

Table 2: List of devices

PULSENSE PS-500B (EPSON)	FuelBand SE (NIKE+)	MOVEBAND® 2 (NTT docomo)	UP2 (jawbone)
SmartBand Talk (SONY)	miCoach Fit Smart (adidas)	Flex (Fitbit)	vivofit (Garmin)
MIO Alpha (FOCALPOINT)	SmartBand SWR10 (SONY)	WristableGPS SS-700s (EPSON)	

Table 3: List of applications

Pedometer for M7 Steps	Runmeter GPS Pedometer	Walker	RunKeeper
Pedometer +	The Walking Collector	Walkr	Hosuukei
Pedometer Pro Runner	Pedmeter POPOPO	WalkPlanner	My Tracks
Manpokei - Sanpohosukeisoku	Sanpokei GPS	OHFUKU	Sanpo no Tomo
Application for Calories burned calculation	Moves	Kyorisoku	Sanpo

Analysis based on visualization levels

We found that the visualization levels for the information required by older users varies considerably depending on the information item. We found apparent differences in the visualization levels for the information provided by existing products depending on the information item, but we also found that information for most visualization levels is already available. We compared and contrasted the information required by older users and the information provided by existing products on the basis of visualization level (Table 4).

Under the category of information items related to walking, for the “number of steps” and “distance walked” items we found that functions satisfying the visualization levels for information required are already available. In contrast, for walking time the functions available have information visualization levels that exceed the needs of those we interviewed, and so instructions on how to use these functions may be needed.

Under the category of information items related to the body, we found that for the “calories burned” item, the functions already available have information visualization levels beyond the needs of our interviewees. In contrast, for the “heart rate,” “blood pressure” and “hydration” items, functions providing the information visualization levels required by older users are not yet available and such functions should be added. In particular, the functions for “blood pressure” and “hydration” do not meet the very basic visualization level of (1) current state, and we believe that such functions should be added as a matter of urgency.

Table 4: Discrepancies between the information required by older users and the information provided by existing products

Information items	Visualization levels				
	(1) Current state	(2) Goal	(3) Gap	(4) Action	(5) Progress
Walking	Number of steps	●	●	●	●
	Distance walked	●	●	●	●
	Time walked	●	●	●	●
Body	Calories burned	●	●	●	●
	Heart rate	●	●	●	●
	Blood pressure	●	●	●	●
	Hydration	●	●	●	●

Conclusion

This study focused on walking by older people, using the twin perspectives of “information items” and “information content” to organize the information required by older people and the information provided by existing products. By comparing and contrasting these perspectives with visualization levels, we have been able to clarify issues relating to products for supporting walking by older people from the viewpoint of information provision. Future challenges may include the need to increase the number of survey participants and conduct additional surveys in different seasons.

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