



# Older Adults' Motivations, Patterns, and Improvised Strategies of Using Product Manuals

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The goal of this study is to explore older adults' perspectives on and usage of product manuals. Seventy Taiwanese older adults were interviewed to discuss their practices and attitudes regarding product manuals for twelve technological products (e.g., microwave oven, digital camera). They also completed a questionnaire about their usage of product manuals. The results revealed that the older participants did indeed use different products and their manuals from the sampled technological products. Their product and manual usage patterns reflect that the older adults would like to spend time using a product and learning about a product from a manual. Nearly all older adults read all or a portion of product manuals when interacting with new products for the first time. Purposes behind reading product manuals included better understanding of the products, recalling forgotten functions, or preventing mistakes. The older adults also improvised various strategies toward product manuals, such as making quick reference cards, marking sections and shorthand formatting, to compensate for the deficiencies of product manuals. Results of this research provide guidance to manual designers or technical writers to better meet older adults' needs and preferences.

**Keywords** – Product Manual, Older Adults, Usages, Attitudes, Strategy.

**Relevance to Design Practice** – It is critical to understand whether, when, and how older adults are likely to use instruction manuals. The research findings reveal that older adults do use product manuals. The interview and questionnaire analysis provided a context for manual usage experience of older adults. The findings provide guidance for manual designers and educators to organize effective product manual guidance that leverages existing knowledge and behavior.

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## Introduction

Similar to many other countries in the world, the older adult population in Taiwan is growing rapidly. In Taiwan, adults over the age of 65 constituted 10.7% of the population in 2010; by 2025, this proportion will increase to 20.1% (Ministry of Interior, 2011). Concurrently, the aging trend is coinciding with the dramatic development of new technology products. In general, these products consist of a variety of devices and services, such as mobile phones, tablets, PCs, e-book readers, digital cameras, camcorders, printers, and more, which have become an integral part of everyday life.

For older adults, these new technology products have the potential to make life easier, to support communication with family and friends, to assist with health care, and to help them remain safe and functionally independent in their later years of life (Dickinson & Hill, 2007). Although older adults report a willingness to adopt technology products (Mitzner et al., 2010; Mynatt & Rogers, 2001), usage data suggest that older adults are part of the “digital divide,” a distinction made between those who do and those who do not adopt technology products (National Telecommunications and Information Administration, 2004). This perhaps stems from the fact that most technology products have many functions, and that their operations are often complex. Also, technology products do not always seem to work properly,

or are so complicated they might seem beyond an older adult's capabilities (Gatto & Tak, 2008).

To compensate for older adults' inexperience with certain technologies, related research has reported that providing supporting information or extra training materials is an effective way to enable and enhance older adults' interactions with technology (Gramß & Struve, 2009; Morrell, Park, Mayhorn, & Kelley, 2000). In fact, older adults would be more comfortable with and willing to adopt new technology products if they received useful supportive information or training materials (Mayhorn, Stronge, McLaughlin, & Rogers, 2004; Mitzner et al., 2010). A product manual is one such kind of support material that older adults can use to become familiar with a product. Product manuals are often associated with the traditional paper-based, electronic, multimedia and interactive approaches for different

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products. A manual is an interface between the user and the product, presenting diverse information and a collection of ways to assist in answering users' questions.

Design guidelines for product manuals (e.g., BS/EN 62079, 2001; International Organization For Standardization (ISO), 1994, 1999, 2004, 2008) defined the general design process and provided well-organized guidance on product manual development. These guidelines address the phases involved in designing, verifying, and producing a user manual. Therefore, it would be in the best interest of both users and producers for product manuals to be created based on this guide. Ideally, the expectation is that users would experience fewer problems, have a smaller chance of damaging devices because of incorrect use, and that producers would experience a decrease in trouble shooting complaints. However, users are generally not satisfied with the manuals that accompany products.

Users have claimed that product manuals are too technical, too complicated, and too difficult to read (Gerbert, 1988; Mohammed & Swales, 1984; Wiese, Sauer, & Rüttinger, 2004). Related studies have provided general insights into the use of product manuals for younger adults. Thirty-seven percent of the participants reported that they would first try to use a new product without referring to external help (Gerbert, 1988). These people may not prefer to use instruction manuals and might try to understand the usage through their own experience. Moreover, about a third of the users read only parts of the manual (Gerbert, 1988). Another study found that 13% of participants said they did not use the manual, 46% used it only to get started, and 41% said they studied the instructional manual thoroughly (Mohammed &

Swales, 1984). A questionnaire on consumers' use of instructions reported that about 34% of the participants would read none of the instruction manual, 13% would read some of the information given, and 53% would read the complete manual (Wright, Creighton, & Threlfall, 1982).

Some studies have also provided general information about older adults' usage of and attitudes about a range of product manuals available to them in their everyday lives. Researchers reported the older adult user group found product manuals to be inaccessible, difficult to use, and did not take into consideration older adults' changing capabilities (Cifter & Dong, 2010; Lust, Showers, & Celuch, 1992; Van Horen, Jansen, Maes, & Noordma, 2001). A study aimed at improving mobile phone instructional manuals for older adults mentioned a gap between the older adults' needs and the intention of the manual developers (Bruder, Wandke, & Blessing, 2006). Another study focused on the mobile phone usability assessment pointed out that male older adults tried first to learn about operation of their phone features by themselves, and if they could not do the operation successfully, they referred to manuals. On the contrary, the 'user manual' was the least preferred learning method for female older users (Lee, 2007).

Assuming that older adults do not have much experience with unfamiliar technology products, it is conceivable that they might want to read the manual to obtain an understanding of the concept and functions of the product and to learn to use it. Therefore, if we want to provide adequate product manuals to older adults, what are the aspects of product manuals we need to consider? Due to the age-related changes in motor, perceptual, and cognitive abilities, the manual requirements for older adults must be considered carefully (Fisk, Rogers, Charness, Czaja, & Sharit, 2009). Moreover, there may be specific aspects that need to be clarified and considered when designing a product manual for older adults. For example, one of the primary sources of decreased visual performance in older adults is related to the loss of acuity (Schieber, 2005). Therefore, increasing the manual text size and contrast would be very helpful for older adults. In addition, the text face and arrangement of relevant graphic details are important considerations in the design of paper-based manuals (Hartley, 1994). Moreover, with respect to age-related declines in cognitive processes that might adversely influence older adults' ability to process instructional content, the manual needs to be context-specific, so that older adults see only the information that is relevant to the task they are currently performing (Bouma, 2001; Van Hees, 1996; Wright, 2000).

Due to working memory decline with age, it is more difficult for older adults to remember a sequence of instructions they have just read (Hickman, Rogers, & Fisk, 2007). An optimal manual would minimize working memory demands, perhaps by providing fewer steps of instruction and including relevant pictures or other recognition cues to help older adults map between their task context and instructional manual (Morrell & Echt, 1997; Van Horen et al., 2001). Furthermore, the manual for older adults needs to minimize particular jargon or terminology

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and provide explanations that can be understood immediately and in a separate glossary, so that older adults can track questions and refresh their memory (Loorbach, Karreman, & Steehouder, 2007).

These studies paint a general picture of the current product manual situation in the aging society, and they urge manual designers and technical writers to think more about optimizing the design of a good manual for older adults.

## Overview of Present Study

An optimal product manual would provide older adults with the supportive information they need at the right time and at the right quality level. Understanding and designing the product manual is as important as the design of the product itself (Bouma, 2001). Previous studies have addressed general issues related to usage of product manuals with younger adult users; however, older adults might have different competencies, qualifications and experiences; perform different product functions; and have different information needs. Manual usage or the attitudes of older adults regarding manuals for a variety of products used in their daily life is unknown. In the present report we provide an analysis of product manual usage of and attitudes for 70 older adults in Taiwan. We employed an interview and questionnaire methodology because these approaches afford a relatively open and exploratory method for collecting qualitative and quantitative data while providing insight into the details of actual manual usage and perceived motivations, patterns and strategies of product manuals in different domains for older adults. These data provide insights into whether, when, and how older adults are likely to use instruction manuals.

## Methods

### Subjects

Seventy Taiwanese community-dwelling older adults participated in this study (age range 65-75;  $M = 70.21$ ,  $SD = 4.53$ ). We recruited participants from the adult community college in different counties to have diversity in terms of variables such as gender, education, and occupational status. Posters and leaflets were given to community groups, and advertisements were placed on each local bulletin board. Participants were screened first for suitability through discussion, either by telephone or in person. Suitable participants were then visited at their home to orient recruits to the study and to collect informed written consent. The recruited participants had high interest in our research and were willing to share their experience related to the interview questions. The participants had a varied educational background: 72% had a high school education or lower, 21% had completed college, and 7% had a master degree or higher. The gender distribution was 58% female and 42% male. Most participants reported living with relatives (79%) or in independent senior housing (5%); the remaining 16% reported living in a house, apartment, or condominium, in public housing, or in assisted living. As expected for this age group, the majority of participants were

retired (60%). The remaining participants reported occupational status as part-time (17%), full-time (3%), homemaker (9%), or volunteer (7%). Four percent of the participants did not specify their occupational status. Most participants (85%) rated their general health to be good or excellent (1 = poor and 5 = excellent,  $M = 3.17$ ,  $SD = .83$ ).

## Materials

### Questionnaire

The questionnaire contained three sections: a demographics section, a product and manual assessment section, and a product and manual usage frequency section. The demographics portion of the questionnaire inquired about the participant's age, gender, educational level, current health status, occupational status and current living situation.

Based on a previous survey (Mitzner et al., 2010), a list of 12 products was compiled as the questionnaire sample products. These 12 products included a microwave oven, washing machine, mobile phone, computer, personal digital assistant, fax machine, blood pressure monitor, MP3 player, stereo, DVD VCR player, digital camera and in-car navigation device. They could be classified into the following domains: home, communication, work, health, entertainment and travel/transportation, to cover the fundamental technology products in older adults' everyday lives.

In the second section, the manual situation assessment sheet allowed participants to report whether or not they currently possessed any of the sample product manuals. Participants reported *yes* or *no* to the question "Do you have this manual?" In the final section of the questionnaire, participants reported the frequency with which they used each of the 12 products and associated manuals in the past year, using a 5-point Likert scale with 1 as "never" and 5 as "always".

### Structured Interview

Participants were given a script and asked (1) "How much will you read the product manual the first time you encounter a new product?" It was assumed that the product was from a new manufacturer or had a new brand name. Then we continued to ask (2) "From your past experience, why do you read the manual?"

The questionnaire and interview questions were pilot tested with five older adults to ensure that the questions were clear and prompted discussion relevant to the issues of immediate interest. The materials are available from the first author of this paper.

## Procedure

Between May and June, 2010, an in-person questionnaire and structured interview of 70 older residents of the Taipei and Taichung area in Taiwan was conducted. Participants were sent a gift for participating in this research. The in-person questionnaire was designed to facilitate discussion about the range of older adults' usage of 12 products and their manuals.

Participants completed the questionnaire and were given a 20-minute break. Next, structured interviews were conducted with each participant regarding their perspectives about using product manuals in the different contexts in question. Interviews were audio recorded for later transcription.

### Data Coding and Analysis

#### Questionnaire

Participants chose one of five frequency options when answering usage questions for each of the 12 products and manuals. The response options were: 1 – “Never”; 2 – “Once in a while”; 3 – “Some of the time”; 4 – “Most of the time”; and 5 – “Always”. To better identify frequency trends, the data were recoded into three frequency responses. “Never” responses were recoded as “Never Used”; “Once in a while” and “Some of the time” were recoded as “Occasionally Used”; and “Most of the time” and “Always” were recoded as “Frequently Used”. Chi-square test of homogeneity were conducted to determine if there were significant differences between products and manual usage frequencies (none of the expected values should be less than 1, and no more than 20% of the expected values may be less than 5). Analyses of residuals were conducted to confirm which product accounted for the significant effects (i.e., when the absolute value of the residual (R) was greater than 2.00, it was considered to have a significant effect on the chi-square test statistic).

#### Structured Interview

The audio recordings were professionally transcribed verbatim with personal information omitted. A segment was defined as a unique idea in a single, uninterrupted speaker turn, related to manual usage. The segmenting process was calibrated by conducting an initial round of independent segmenting of one randomly selected transcript

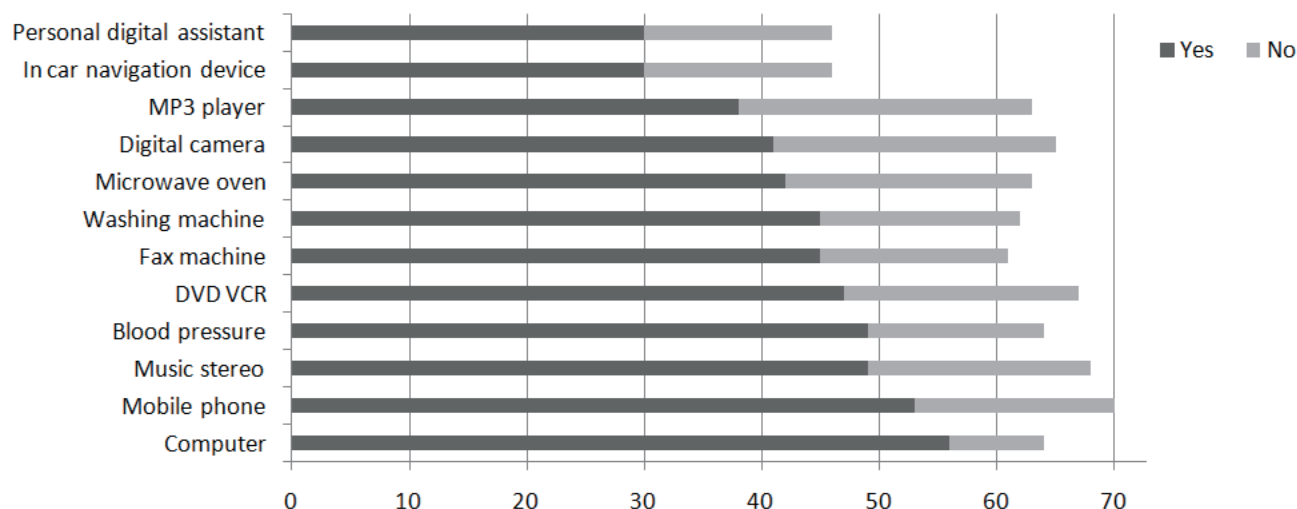
followed by discussion of discrepancies between coders. A second round of independent segmenting on a different transcript yielded reliability estimates ranging from  $r = 0.72 \sim 0.83$ .

Three independent coders applied the coding scheme to all segments, and each segment was coded on all dimensions. Interviews were coded in their original language and then translated for reporting in the research. Coders were calibrated by conducting three rounds of independent coding on the same three randomly selected transcripts followed by discussion of discrepancies and revisions to the coding definitions. Coding reliability was calculated for a sample of the transcripts and ranged from 80-85 percent agreement. The complete coding scheme is available from the first author.

## Results

### Number of Participants Who Had the Product Manual

To understand if the older adults held onto manuals for different products, we asked those who had experience using the product to indicate their current manual situation as, “Do you have the manual?” Figure 1 indicates that more than 50% of older adults had kept their product manual for each product. Items such as computer and mobile phone were associated with the highest numbers of manuals retained. This finding may reflect the fact that older adults keep the manual and use the manual with specific complex products. Older adults who did not retain the manual reported that they got the product from their family or purchased second hand, so there was no complete instructional manual for them to use. They needed to search for the instruction manual at the brand’s support website or buy the replacement in store at an exorbitant price. The instruction material may be hard to find or get for free, which could cause older adults to be unable to use the product properly.



**Figure 1. Number of participants who still owned their product manual for different products.**  
The total numbers do not equal 70 because these data only represent participants with experience using the product.



## Product and Manual Usage Frequency Reported

Table 1 shows the distribution of responses to the question, "How frequently did you use the product in the past year?" For participants who had experience using these 12 products, over 40% of the older adults had more frequently used a microwave oven, mobile phone, fax machine, mp3 player, music stereo and digital camera. Especially, mobile phone was the product that every older adult had used in the past year. This pattern shows that mobile phones have become an essential part of most older adults' lives. Fewer participants reported using personal digital assistants and in-car navigation devices. Over 50% of the older adults reportedly using the following products occasionally: washing machine, computer, blood pressure monitor and DVD VCR player.

Participants also reported how frequently they used product manuals. The participants who used the product and manual were counted as the percentage of manual usage rate. In each product, over 60% of the older adults reported using the manual frequently or occasionally, whereas less than 40% of the older adults reported never used the manual. Some common domestic products such as the washing machine and music stereo had reportedly much less manual usage than the other products. Moreover, the digital camera and mobile phone reached the highest frequency manual usage rate.

A chi-square test of independence was performed to examine the relation between two categorical variables on product and manual usage observed frequency. Significant differences ( $p < .05$ ) emerged between the product and manual usage frequency for the mobile phone ( $\chi^2 = 8.9$ ,  $df = 2$ ,  $p < .05$ ),

**Table 1. The distribution of 12 products and manual usage frequency in the past year (N=70).**

Domain	Product	Product usage frequency	Manual usage frequency					
			Never		Occasional		Frequent	
			N	%	N	%	N	%
Home	(1) Microwave	Never	13	18.6	0	0	0	0
		Occasional	9	12.9	12	17.1	5	7.1
		Frequent	7	10.0	17	24.3	7	10.0
	(2) Washing machine	Never	8	11.4	0	0	0	0
		Occasional	18	25.7	12	17.1	6	8.6
		Frequent	11	15.7	9	12.9	6	8.6
Communication	(3) Mobile phone*	Never	0	0	0	0	0	0
		Occasional	5	7.1	10	14.3	6	8.6
		Frequent	18	25.7	7	10.0	24	34.3
Work	(4) Computer*	Never	6	8.6	0	0	0	0
		Occasional	8	11.4	25	35.7	6	8.6
		Frequent	7	10.0	8	11.4	10	14.3
	(5) Personal digital assistant	Never	34	48.6	0	0	0	0
		Occasional	5	7.1	7	10.0	6	8.6
		Frequent	6	8.6	6	8.6	6	8.6
(6) Fax machine	Never	9	12.9	0	0	0	0	
	Occasional	11	15.7	11	15.7	5	7.1	
	Frequent	8	11.4	17	24.3	9	12.9	
Health	(7) Blood pressure monitor*	Never	6	8.6	0	0	0	0
		Occasional	11	15.7	21	30.0	6	8.6
		Frequent	13	18.6	6	8.6	7	10.0
Entertainment	(8) MP3 player*	Never	7	10.0	0	0	0	0
		Occasional	10	14.3	18	25.7	7	10.0
		Frequent	17	24.3	5	7.1	6	8.6
	(9) Music stereo	Never	2	2.9	0	0	0	0
		Occasional	7	10.0	10	14.3	8	11.4
		Frequent	21	30.0	12	17.1	10	14.3
(10) DVD VCR*	Never	5	7.1	0	0	0	0	
	Occasional	8	11.4	23	32.9	9	12.9	
	Frequent	12	17.1	7	10.0	6	8.6	
Travel and Transportation	(11) Digital camera**	Never	5	7.1	0	0	0	0
		Occasional	9	12.9	14	20.0	8	11.4
		Frequent	5	7.1	7	10.0	22	31.4
	(12) In-car navigation device	Never	24	34.3	0	0	0	0
		Occasional	6	8.6	13	18.6	5	7.1
		Frequent	8	11.4	7	10.0	7	10.0

Note: \*  $p < .05$ , \*\*  $p < .01$ , represents significant overall difference between product and manual usage frequency.

computer ( $x^2 = 7.1, df = 2, p < .05$ ), blood pressure monitor ( $x^2 = 6.55, df = 2, p < .05$ ), Mp3 player ( $x^2 = 8.56, df = 2, p < .05$ ), DVD VCR ( $x^2 = 6.83, df = 2, p < .05$ ) and digital camera ( $x^2 = 9.89, df = 2, p < .01$ ).

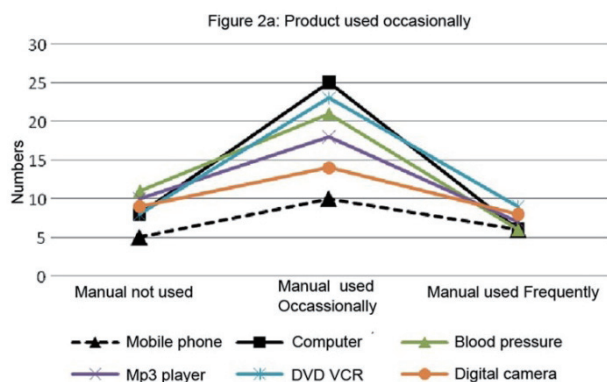
In Figure 2, panels a and b illustrate the significant association between product and manual usage tendencies for six products. The manual usage tendencies varied as a function of how frequently the older adults used the product. The data depict a pattern suggesting that when a product is used occasionally, the manual is used occasionally (Figure 2a). Similarly, when a product is used frequently, the manual is used frequently (Figure 2b). Interestingly, there were some older adults who used products frequently (e.g. mobile phone, mp3 player) but who tended to not use product manuals. Their more frequent product experience could be a factor affecting their manual usage attitude. Also, some older adults were more likely to frequently read the manual accompanying those products that they did not use very often (e.g. DVD-VCR and digital camera). The data point to clear boundaries if the older adults had motivation to use the products.

### Manual Usage for First Time Interaction with New Products

Participants indicated how much of a manual for a new product they would read. A total of 80 segments from 63 older adults were coded that indicated how much older adults would read the manual. After the segments were coded, significant differences were identified among the frequencies in three categories ( $x^2 = 28.5, df = 2, p < .001$ ): none, some, and all (see Table 2 for numbers, percentages and example quotes).

Over 50% of the segments were related to reading all parts of the manual to become acquainted with the new product. For example, when older adults said that they would read the entire manual with a new product, that product tended to be less familiar to them, and they considered it better to read the manual thoroughly. Over 30% of the segments revealed that older adults liked to read some of the manual for a basic review or references.

Less than 10% of the segments were about trying to use the new product without reading the manual. These older



**Table 2. Numbers and percentage of segments on using manuals with new products.**

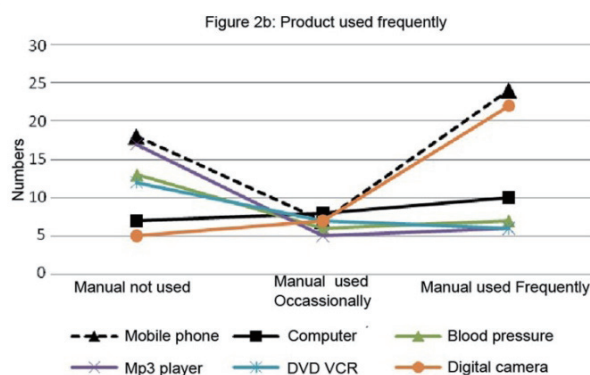
Coding Scheme Categories	N	%	Example quoted and translated from Taiwanese
None	7	8.0	<ul style="list-style-type: none"> <li>The manual provides very little in the way of instruction and not worthy to read.</li> <li>It is better to ask an expert or experience try and error instead of reading the manual.</li> </ul>
Some	27	33.7	<ul style="list-style-type: none"> <li>I will read parts of the manual.</li> <li>Choosing the basic part to read.</li> </ul>
All	46	57.5	<ul style="list-style-type: none"> <li>I have the desire to read the entire manual under this situation.</li> <li>I think it is better to read the whole manual if there maybe something important I need to know.</li> </ul>

adults claimed that the manual provided very little in the way of instruction and were not worthy of reading even if the product was new to them. Instead, they would choose trial and error, asking an expert, or depending on past experience with beginning usage.

### Purpose for Reading the Manuals

Participants reported their responses to the question, "From your past experience, why do you read a manual?" A total of 92 segments from 52 older adults were coded as purposes/reasons. Significant differences among the frequencies ( $x^2 = 14.6, df = 5, p < .05$ ) in six categories were identified (see Table 3 for percentages and example quotes).

Older adults provided many reasons for using product manuals. Trying to gain a better understanding of the product and supporting forgotten information were the two most frequently mentioned reasons for using the manual. Older adults were also afraid of making mistakes or misusing the product, so they depended on the manual in case of some unexpected situation. In



**Figure 2. Six significant products and manual usage tendency.**

Figure 2a presents data on products used occasionally; Figure 2b presents data on products used frequently.

particular, older adults reported having a manual so they would not have to bother their family members for assistance. Other ideas such as exchanging opinions with peer learners or gaining self-confidence were also mentioned by older adults. These data provide insight into the diverse reasons for which older adults use product manuals.

### Personal Strategy for Using the Manual

During the interviewed session, we also found there were different strategies that older adults used for the manual. This aspect was not included in the original interview script; the older adults spontaneously described their personal strategies while talking about the manual usage experience. This is an important extra finding because it reflects another dimension of older adults' manual usage.

The most popular strategy for older adults (20%) was to create an extra paper sheet as a quick reference cards (Figure 3). This can be useful to remind older adults how to complete a task without having to refer to the main body of the original manual, which was often many pages long. For 12% of the older adults, they modified the manual to make it easier to use, rewriting or marking the manual content in blank areas (Figure 4), because they indicated that the manuals did not present information in the most appropriate format. Also, they diagramed the layout of the product and placed it on the cover of the package box for clear and immediate assistance (Figure 5). Older adults also reported using colorful small tags among different pages for the references. Some older adults reported that they would tear out selected sheets from the manual to place into a new binder.

Older adults with computer experience said they would use an online forum (e.g., Yahoo! Knowledge or Google Answer) to ask specific questions or get tips that would not be found in the manual. However, questions on a forum are very specific to a certain person's problem, and do not relate to the general understanding, set up, or use of the product. Older adults must know quite a lot to be able to ask the right

question on Internet forums. They need to hope and wait for someone to reply and they do not know how long it will take; there is no guarantee that will get any answer, much less the correct answer to their question. Another idea heard from the older adults was that they hoped companies would publish available manuals via wiki pages, where they could modify the manual from their perspective. Lastly, some older adults expressed that they would ask a family member to explain the whole process of interacting with a technology and record the interaction in audio or video files. These strategies reveal that many product manuals do not meet older adults' needs. The older adults reported strategies that were focused on making the explanations in the manual more understandable to them.

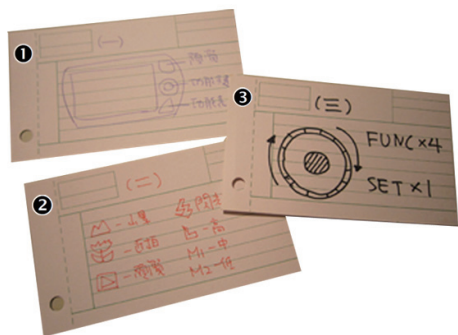
### Discussion

This study systematically investigated older adults' usage of and attitudes towards product manuals. Rich and informative data were gathered through a combination of questionnaires and structured interview questions. A more detailed depiction of older adults' attitudes about product manuals was obtained as compared to previous research studies (e.g., Lust et al., 1992; Van Horen et al., 2001; Wright et al., 1982).

Past research has mentioned that users generally did not like to use manuals because they thought manuals were too difficult to read (Gerbert, 1988; Wiese et al., 2004). However, the situation for older adults might be different. We found that older adults retained their manuals to get needed information for a better understanding of the product. The older adults who had retained their product manual pointed out that paper-based manual is the most common form currently provided from different products. The paper-based manual could be preserved and stored conveniently; it was also available over the whole usage period. It is notable that more and more companies tend to create digital and interactive manuals as a cost-saving measure. For example, Hyundai Corporation announced that with its new sedan, the instruction manual will come loaded on iPads. The

**Table 3. Numbers and percentage of segments on the purpose of using manual.**

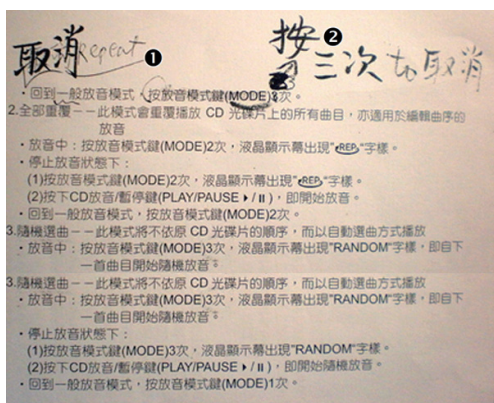
Coding Scheme Categories	N	%	Example quoted and translated from Taiwanese
Better understanding with the products	25	27.2	<ul style="list-style-type: none"> <li>The main purpose to read the manual is to obtain product knowledge.</li> <li>When I correctly use it, the images are great! I read the manual to find out all the settings.</li> </ul>
Recall forgotten functions or tasks	21	22.8	<ul style="list-style-type: none"> <li>My purpose is to review the forgotten task, especially for the sequenced function.</li> <li>Immediate recall from the manual and quickly answered my question.</li> <li>Reduced my memory load of forgotten functions.</li> </ul>
Preventing making mistake	16	17.4	<ul style="list-style-type: none"> <li>Better safe than sorry. I am afraid of causing any mistake or problem which results in big trouble.</li> <li>Many news reports reported the tragedies of misusing a product because of not reading manuals.</li> </ul>
Not to bother family members	13	14.1	<ul style="list-style-type: none"> <li>I feel frustrated when my relatives impatiently teach me.</li> <li>My personality is independent, so I don't want to bother other people.</li> </ul>
To exchange opinions with peer learners or friends	9	9.8	<ul style="list-style-type: none"> <li>I can share what I learned with my friends and teach them how to use the cell phone.</li> <li>I am a manual reader - and have a friend who isn't. Whenever she can't get something to work, she calls me over and hands me the manual!</li> </ul>
Strengthen confidences	8	8.7	<ul style="list-style-type: none"> <li>I feel more confident of following the manual instruction to use my products.</li> </ul>



Card 1: The basic functions of buttons  
 Card 2: The icon and jargon introduction  
 Card 3: Task notes: Press the function button for 4 times; Press the set button for 1 time

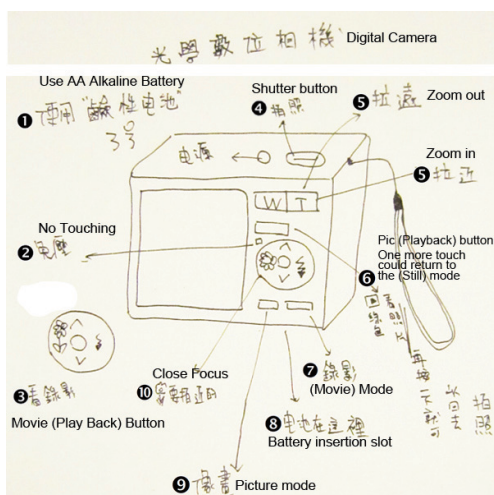
**Figure 3. Self-made quick reference cards.**

The three cards show the sequence of tasks, jargon and icon descriptions of a digital camera, which served as a memory aid for older adults.



1 Cancel  
 2 Press the button for 3 times for cancellation

**Figure 4. Self mark session (Older adults modified part of the sentences from a Chinese version CD-player manual).**



**Figure 5. Older adults re-diagramed the layout and rewrote the button function of a digital camera.**

original idea was that the iPads could be used to give information in a very easy and user-friendly way, and include videos and pictorial representation. The digital material could have the potential benefit of less cost than the spending of printing and distributing paper copies. Moreover, it can be searched to find any word or phrase. It can also be delivered with the Internet or barcode technique, and it is not susceptible to getting torn, dirty, wrinkled, or lost.

Despite these advantages, in our research older adults reported that manuals created in digital forms (e.g., electronic files, multimedia, interactive CD-Rom) would cause potential problems for manual use and preservation. Older adults may lack basic computer or technology domain knowledge, which would keep them from using these kinds of digital materials. A small number of older adults said that they would accept computer materials instead of a traditional textbook if given the option; however, the majority of the respondents reported that they preferred paper-based manuals to digital materials. This finding is similar to other studies that reported older adults' attitudes and preference for the comparison of paper and digital materials based on the reading habits and performance (Champley, Scherz, Apel, & Burda, 2008; Poon & Meyer, 1997). It is important to get the balance between conventional and novel manuals on their searchability, accessibility, ease of update, ease of preservation, cost, and at the same time, to consider the limitations of older adults. Integrating these ideas will improve the use of current manual, and stimulate ideas for future manual design.

The results indicate that older adults who more frequently use a product would be more likely to use the manual; those who occasionally use the product would be also expected to refer to the manual as well. The pattern was observed for the complex digital products (mobile phone and digital camera) which comprised the different factors that may contribute concurrently to a product's complexity (i.e., menu structure, number and modes of keys, clarity of functions' naming and their relative location in the menu). It can be assumed that the product complexity would affect older adults' technology learning preferences or motivation on the frequencies of manual usage (Chaffin & Harlow, 2005; Mitzner et al., 2008). Therefore, future research in this area should measure product complexity level as it relates to manual usage and preferences.

It is notable that some older adults reported never using product manuals for particular domestic appliances. Older adults with high prior experience may think that they do not need further information, so they do not refer to the manual. As Wright (2000) pointed out, for these participants, prior experience with a product must be considered; the needed information from a manual could be different than when a user has little or no experience with a product (Lee, Czaja, & Sharit, 2009; Rupiotta, 1990). The majority of older adults, however, reportedly would read all or a portion of the manual at first. Thus, the clarity and readability of the product manual information is very important. Older adults may have different information needs of the manual when facing a new or unfamiliar product. We assumed that the manual information which older adults wish to receive could be various.



Some older adults may wish to obtain an overall picture of the product, whereas others are only interested in a specific feature. Under this circumstance, what type of information needs to be explained in detail (e.g., terminology, interface elements and task description)? And what kind of information can help older adults construct a basic concept or framework of the product? Indeed, effective information delivery depends on the older adults' profile, which varies with older adults' product experiences and type of information (Ummelen, 1997). More or less information in the manual content could cause difficulties for older adults, attributed to the information-processing differences (Birren & Schaie, 2005).

These results were not consistent with the traditional myth that users do not read manuals. Product manual designers or technical writers may assume that users never read all or part of the manual that is included with a product, and therefore they just follow their own concept or update an old manual version. This approach causes a knowledge gap between the target user and manual designer. Many product manuals are written by a manual designer or technical writer who has neither the time nor the inclination to determine user needs. Although many products are well designed for ease of use, it is a pity that many manuals do not follow this same path. Manuals should be user friendly for ease of use in the same way that products should be designed for ease of use. Even if there are some limitations for the current manual design environment, it is still important to consider and elevate the instruction manual to become an integral part of the user's intention in the initial design phrase.

A thorough understanding of older adults' usage and personal strategies toward product manuals is essential for maximizing the potential assistance that a good product manual can offer. Carefully designed manuals can facilitate older adults' independence and increase their self-confidence in using products in everyday life. Indeed, from our research, older adults did express positive attitudes about the purpose of using product manuals. Perhaps not surprisingly, older adults might face different challenges and difficulties when the product is unfamiliar to them (Lust et al., 1992; Van Hees, 1996). One of the possible solutions is relying on the manual to solve the problems or preventing mistakes (Lin & Hsieh, 2006). Several reasons for reading the manual mentioned in our investigation were consistent with the findings of Bruder et al. (2006) and the fundamental theory in a previous study (Lee, Smith-Jackson, Nussbaum, Tomioka, & Bhatkhande, 2004). The results indicate that besides gaining a better understanding of the products, the manuals provide a psychological factor in that being able to recall forgotten functions and prevent mistakes, so as not to bother family members, would strengthen confidence. Obviously, older adults want to maintain dignity and independence in their later life. They believe if a well-organized manual were provided, they would have more flexibility when encountering problems. The findings also urge designers to pay more attention to the issues surrounding why older adults want to use a manual.

Older adults used personal strategies to compensate for the insufficient parts of the manual. These strategies included quick reference cards, shorthand formatting, diagramming, tagging, and

restructuring the key pages. Such methods contribute concrete recommendations for manual designers and technical writers. Moreover, the improvised strategies could be transferred into guidelines when creating a manual, such as using lots of white space, using color-coding to aid navigation, providing durable covers and pages, and considering whether the user needs to hold the manual and work at the same time. For future product manual development, researchers could also transfer parts of the concept and integrate a comprehensive evaluation to verify possible applications to see what works and what does not. Furthermore, including older adults into the product manual design process can also help to define basic functions and make the explanations in the manuals more understandable. These improvements would produce more and broad benefits than those just for older adults. When product manuals are designed inclusively, the products can be usable by a broader range of users, thus resulting in better performance.

A lot of practical product manual projects have quite successfully incorporated special considerations for older people into their design work. For example, the Helen Hamlyn Center and Samsung Design Europe developed a tip sheet for designing the senior-friendly manual "Out of the Box," which was specifically based on research on aging, cognition, and technology use. This valuable resource is available online <http://www.claragaggero.com/>. Furthermore, there are more technology supportive materials available for teaching older adults how to use novel technology products and services (Hinton, 2009; Muir, 2010; Peterka, 2009). Those technology supportive materials exist to help older adults discover and master technology products, computing and the Internet, so they can take advantage of all it has to offer. These supportive materials try to cover fundamental knowledge about technology in a way that makes them easy for the beginner or technophobic, but also introduce fun new technology applications for older adults to explore.

Finally, no matter how much we investigate the attitudes and factors that can make a product manual easier to use for older adults, it will remain the practical case that real-testing and involving older adults in the manual development is essential. If the manufacturers and suppliers could consider in-depth older adults' usage and attitudes with product manuals, it would be beneficial for them to offer manual support that is easily accessible to diminish misunderstanding.

## Conclusions

Combining the data in our research and in the previous literature (Bouma, 2001; Morrell & Echt, 1997), it is clear that older adults do care about and use product manuals. An increased awareness of, usage of, and attitudes toward product manuals has provided an accommodative foundation for product manual design concepts. Product manuals are aimed at end users and contain instructions on how to use the product. For older adults, a good product manual could help them get useful information and the basic concepts about the product. Well-designed manuals can provide assistance with activities of technology learning, and also have the potential to improve older adults' quality of

life by facilitating more independence and confidence. Across a broad range of products in our research, older adults used product manuals and presented different attitudes and motivations based on their manual usage experience. Current usage patterns and improvised strategies of product manual usage gleaned from older adults can provide insight that could make manuals more likely to be user-friendly and therefore help in the greater adoption of products. Moreover, product manual developers can benefit from our findings by gaining a better understanding of older adults' needs and preferences to improve the quality of product manuals. Generally, such improvements will likely benefit the broader population, as well as specifically benefit older adults.

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