Quest for Research Excellence On Computing, Mathematics and Statistics

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Chapters in Book

The 2nd International Conference on Computing, Mathematics and Statistics (iCMS2015)

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Content

CHAPTER 3
Senior Citizen and Online Form: Hybrid Guideline Form Design

Zanariah Idrus, Nor Hafizah Abdul Razak, and Noor Hasnita Abdul Talib

Abstract. The World Health Organization predicts by year 2020, senior citizens population will be more than 1 billion. They are progressively exposed to technology and to understand their requirements is significant in human interface design. But, the online form interface design tends to ignore the issue of ease of use especially for senior citizens aged 60 and above. A well known Delivering Inclusive Access to Disabled and Elderly Members (DIADEM) guideline outlines the recommended online form design for the senior citizens. DIADEM is specifically tailored for senior citizens with age 65 and above only and not relevant for Malaysia culture. WeFDeC guideline aligns the online form design based on the Three Layer Model (Perceptual, Conversational and Relationship layers). Though it is an acceptable guideline for online form but it does not take senior citizens into consideration. Therefore, this study compared WeFDeC and DIADEM guideline, identify the weakness and create a new hybrid guideline. The new hybrid guideline (Elder-WeFDe) which should fit with senior citizens online forms was introduced. This guideline is relevant for different purpose of online forms; application, services and e-commerce. It also able to guide web or online form designers to design a better and ease of use online forms for the senior citizens as well as for all age of groups.

Keywords : Internet and web activities, Online form, Senior citizen, Human Computer Interaction (HCI), Online Form Design

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1 Introduction

By the year 2020 the World Health Organization estimates that population of the world will be around 8 billion people. From the statistic, it is being predicts that the senior citizens population is more than 1 billion. They are progressively exposed to the technology and to understand their requirements is important in human interface design. As define, "human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them" [1]. When users interact with a computer system, they do so via a user interface (UI). Senior citizens perform the same online activities as most other groups such as in daily communication, online services, online application and e-commerce. But unfortunately, the online form interface design nowadays tends to ignore the issue of ease of use especially for senior citizens.

In order to deal with the issue researcher has conducted a study on two different guidelines known as Delivering inclusive Access to Disabled and Elderly Members (DIADEM) and WeFDeC as a reference to produce a hybrid guidelines for senior citizen. In general, DIADEM model is a project designed using web – based assistive technologies to help out the senior citizen in accessing, completing, and submitting online forms [2]. Meanwhile, WeFDec guideline is a guideline in a form of checklist created based on Three Layer Model (TLM) consist of perceptual, conversational and relationship layer that provide a guidance to developers and designers in designing the online form [3]. WeFDec guideline is designed purposely focusing on layout, interactions, formatting, and labelling of forms clearly. It has omitted the issues of creating online form according to the users' needs. Based on the topic emphasized earlier, a hybrid guideline is created to further upgrade the requirement in online form application design for senior citizen in order to overcome the usability dilemma.

Nowadays, technological advancement has shown a substantial growth in many fields of life. Most of our daily activities involved with online activities. As technology advances, it reverses the characteristics of every situation. The age of automation is going to be the age of 'do it yourself'. This phenomenon also give a huge impact to senior citizens as they also perform the same online activities as most other age groups such as in daily communication, online services and online application. However, due to the aging limitation as people grow older, their physical, visually, auditory and cognitive abilities decline most of these online activities cannot be established [4]. This is because not all the web services are specifically designed for the need of older people.

Based on the above issues, this research has studied two types of online forms guidelines to find ways in overcoming the problems. Starting with Web

Form Design Checklist (WefDeC) guideline, outline the online forms design based on the Three Layer Model (TLM) which consists of Perceptual (Appearance), Conversational and Relationship Layer [3]. Though it is an acceptable guideline for online form but it does not take senior citizens into consideration. Second is Delivering Inclusive Access to Disabled and Elderly Members (DIADEM) guideline which was implemented in Europe outlines that recommended online form design for senior citizens. The results indicate that it is an important reference for senior citizens online form design [2]. Unfortunately it is only targeting for citizens aged of 65 and above which is not suitable for our Malaysian culture. This is based on article produced by Portal Rasmi Bahagian Pasca Perkhirdmatan, the National Policy on senior citizen has defined that old are those above the age of 60 years. They can be further categorized into group age of "Old-Young" (65-74), 'Old-Old' (75-84) and 'Very Old-Old' (>85) [5].

Referring to the limitations on both guidelines, this research tends to produce a hybrid guideline which able to overcome the problem in designing online forms that suitable to the needs of senior citizens.

The aim of this study is to further upgrade the requirement in online form application design for senior citizen in order to overcome the usability dilemma. Therefore, the main objectives for this research are to compare the existing online form design guidelines and to produce a hybrid guideline for online form design focusing on senior citizens.

Online forms are used widely today in our daily lives. It is hoped that the results of this study should be able to guide online forms developers in designing a better online forms. This hybrid guideline is also relevant for different type of online forms and fulfil the requirement of the senior citizens. Better forms will increase satisfaction and reduce error.

2 Related Work

Internet plays an important role in every single life either for the youngsters, middle-aged or the senior citizen. Yet, the rate of using internet nowadays is growing rapidly. Older user of internet do much the same activities as the most of the age groups like communication, information searches and online services. Besides that, business opportunities also attract elderly people to use the internet even faster than the demographics [6]. Here are list of other activities involving the older internet user according to [7] for three different developed countries; United State, United Kingdom and France.

Population in Malaysia increases year by year. Many different applications developed by government, organizations and institution to provide online services to the users from all walks of life such as Malaysia electronic government (e-government). E-government was launched to

provide efficient online application services to Government-to-Citizens (G2C), Government-to-Business (G2B) and Government-to-Government (G2G) [8]. It leads Malaysia to the Information Age.

Increasing of the elderly population has required the governments to broaden their e-government services to the senior citizens [9]. They are among the fastest growing group of the internet users. The major reasons that may contribute to the vast use of the internet among senior citizens are due to the increase amount of the relaxation time, a desire to communicate with people they love and easy to access useful information and services provided by the web facilities for example comparison shopping, financial services, travel information, and health services [10]. Statistic data of time series population projection by age for Kedah state and gender; from Department of Statistic, Malaysia, 2013 shows that the population of citizens is going to increase year by year for all ages; youngster, middle-aged and senior citizen from both genders; male and female.

According to Morrell et.al [11] to those who are over 60, and prefer doing indoor activities, internet is a priceless medium for them. It allows them to spend their quality time at home. In addition to that, in the year of 2000, adults aged 60 or older in Malaysia represented 6.5 % of the population. By the year it is estimated that there will be about 15 % of Malaysian population is adults and above 60 years, which is more than twice their number in 2000 [12]. Czaja [13] mentioned that although most of them could benefit from online access, but they may lack of confidence to interact via computer technology as compared to younger people.

Definition of senior citizen varies according to different countries. No specific definition is given to the term. Different societies have different definition for senior citizens. They can be regarded as senior when they retire or become grandparents. Senior citizens are also associated with disability to perform as aggressive as their early age (Senior Citizen, 2010). Many of their abilities have decline like contact sensitivity, colour perception and decreasing ability to focus near object [4].

According to [6] the seniors are users aged 65 years old or older. But some other country like Denmark 65 is too young to define as seniors since the retirement age is 69 years. In the WHO document, 'Definition of an older or elderly person most developed world countries used 65 years as a definition of elderly or older person. [7]. The retirement age or medical benefits are normally used as a guideline to define the age for the senior citizen in governmental context. In contrast for commercial contexts, where it may supply as a marketing device to catch the attention of customers, the age is often much lower [14].

Hence, for this research the senior citizen is define as those age from 60 and above since the standard retirement age is currently 58 in Malaysia (Kaur & Syed Taha, 2011) and many benefits are given to the elderly aged around

the range stated. This definition is according to the statement done at "World Assembly on Ageing 1982" at Vienna (Kaur & Syed Taha, 2011).

Human Computer Interaction (HCI) is a discipline concerned with the study, design, construction and implementation of human-centric interactive computer systems [1]. Human-Computer Interaction (HCI) can be defined as the ways humans interact with information, technologies, and tasks, especially in business, managerial, organizational, and cultural contexts. The primary goal of HCI is to make sure of a better interaction between user and computers, via making computers more user-friendly and easier to use. Developing descriptive and predictive models and theories of interaction.

According to Terblanche [15] in their paper entitled Guidelines for the Design and Creation of a Web Form to Facilitate the Registration of First Time Tax Payers: An HCI Approach; three key areas of HCI are studied which are firstly, the human or user who will be using a particular system or device, secondly, the computer or a system that the user will use and thirdly, the process of using the system, which is known as the interaction that takes place between the human and computer or the user and system. In the paper, three aspects for the tax registration studied are human, computer and interaction.

There are many factors that can be taken into consideration in order to come out with new online form guideline design for senior citizen. According to [7], there are four age-related functional limitations that can be considered which are vision decline, hearing loss, motor fail diminishment and cognitive effects. Besides that, according to seniors performance for vision, dexterity and memory is not as good as the younger citizens (21-55 years) [6].

Delivering Inclusive Access to Disabled and elderly Members of community (DIADEM) is a project to assist older adults when accessing, completing and sub-mitting online forms by developing web-based assistive technologies that adapt the online form according to users' needs. DIADEM is used to develop an assistive web-based technology where the client side DIADEM is plug-into a web browser that adapts and personalises online forms like e-government welfare forms based on the individual older users' needs and preferences[2]. There are five key themes identified from the research conducted which are Assistance, Trust, Layout, Technology paradigm and Language.

The best thing to establish consistency in forms design is to develop forms design guideline. It provides guidance and references to developers and designers in the layout, interactions, formatting and labelling of forms clearly. Guidelines are essential to web designers in designing usable web forms. WeFDec checklist guideline, outline the outline forms design based on the Three Layer Model (TLM) which consists of Perceptual (Appearance), Conversational and relationship Layer [3]. Though it is acceptable guideline for online form but it does not take senior citizen into consideration.

Web Accessibility for Older Users: A Literature Review is a document that review and analyse the comparison between guidelines and articles relating to the needs of older people with Web accessibility needs due to ageing, with the needs of people with disabilities as already addressed in WAI guidelines. This review is being performed in order to notify the development of educational materials which can better endorse the needs of people who have accessibility needs because of ageing, and potential development of profiles and/or extensions on WAI guidelines [7].

Based on the review [7], where a series of interviews conducted with the older adults (over 60 years), combined with evaluation of some prototype, initial set of seven form guidelines is derived which are form layout, simplified question structure, question completion assistance, additional information, data entry, form personalisation and form submission. Then it follows by another six more guidelines which are bullet point instructions, justification for personal/sensitive questions, security information, help and assistance feature and save and return.

The world's population is increasing day by day not only involves young people and middle-aged but also senior citizens. The evolution of current technology makes each of the individual do not want to miss single benefits from technology development. Computer and internet skills are growing at every age. Government institutions and many other organizations prefer to use the online application to send or or/and receive information between users such as online form application because it is faster and more efficient. But the online application form mostly does not concerned about the limitation (health and physical disability) of users from different ages especially senior citizen. Color selection, font (type and size) and lack of assistance is defined to be some factors that may decrease their performance in using many available online services. Therefore, it is recommended that every designer should emphasize the needs and constraints of each user from different age groups before creating the online form application so that it can be used by everybody accordingly.

3 Methodology

The research methodology was divided into two phases. The first phase, Exploratory and Comparative Phase includes the Identify Research Problems, Identify Characteristics of Guidelines as well as to Compare the Two Guidelines. In the second phase, a Hybrid Online Form Guideline was introduced.

Identifying research problems is the first step in the Exploratory Comparative Phase and was conducted to determine the existing problems. Problems identified in this research are gathered from articles, journals and current web blogs. Issues and problems are put together, analyzed and aligned

with the next step.Criteria involved in each guideline were identified and grouped according to the elements. The WeFDeC explains about the Relationship, Conventional and Perceptual Layers. DIADEM contains elements of Assistance, Trust, Layout, Technology Paradigm and Langugage.

Both the guidelines are compared based on the elements. The weakness and limitations of both guidelines are identified. In producing a hybrid guideline, issues collected from articles, journals and web blogs are referred. This information is compiled with the result of the comparison. Improvement was being made by regrouped the elements and adds some additional values to the elements.

4 Result

The first part elaborates the comparison of WeFDeC and DIADEM Guidelines. While the second part, outlines the improvement introduced in the new hybrid guideline.

Comparison of WeFDeC and DIADEM Guidelines

Six elements are compared; Online Form Layout Design, Use of Appropriate Language, Interaction, Technology, Provide Assistance and Create Trust. Weaknesses and limitations are identified.

Hybrid Guideline Development

In this section, the previous result is used to develop a new hybrid guideline (Elder-WefDe). A few weaknesses and limitations have been identified. Elder-WeFDe has been developed based on the comparison result as an improvement to the existing guidelines. Improvement was being made by regrouped the elements and adds positive emotions to the elements. A new Clear Purpose element is added. Therefore, Elder-WeFDe consists of Clear Purpose, Appealing Form Layout Design, Polite Language, Successful Interaction, Assistive Technology, Helpful Guidance as well as Trust and Loyalty.

Elder-WeFDe is introduced to fullfill the need of the senior citizen as well as for all users. Elder-WeFDe established a friendly bond between the senior citizen and the online forms. In practical, users especially the senior citizen feels comfortably and able to fill up the form effectively.

Table 1 below outline Elder-WeFDe guidelines elements suitable to the senior citizen and able to overcome the identified problems.

Table 1. Elder-WeFDe guideline elements

ELEMENTS	DETAILS
Clear Purpose	The purpose is clear and transparent. Identify the purpose of the online form either for application, services or e-commerce.
Appealing Form Layout Design	Create attractive and user friendly online form layout design
Polite Language	Use polite, simple and user friendly words
Successful Interaction	Create a pleasing and satisfying Interaction between the users and online forms
Assistive Technology	Provide usable and helpful technology
Helpful Guidance	Provide clear instructions and smooth flow
Trust and Loyalty	Provide confident and trustworthy environment

5 Conclusion

This study revealed the problems faced by the senior citizens in filling the online forms. Online form interface design tends to ignore the issue of ease of use especially for senior citizen. A well known Delivering Inclusive Access to Disabled and Elderly Members (DIADEM) guideline outlines the recommended online form design for the senior citizens. DIADEM guidelines were implemented in Europe and the results suggest that it is important as a reference for senior citizens' online form design. But it is specifically tailored for senior citizens with age 65 and above only and not suitable for Malaysia culture. WeFDeC guideline aligns the online form design based on the Three Layer Model (Perceptual, Conversational and Relationship layers). It is an acceptable guideline for online form but it does not take senior citizens into consideration. The methodology follows four phases; identify the research problems, identify charateristics of the guidelines, compare the two guidelines and produce a new hybrid guideline The outcome is a new hybrid guideline; Elder-WeFDe. This guideline is suitable for senior citizens and relevant for application, services and e-commerce online forms.. The new hybrid guideline (Elder-WeFDe) able to guide web or online form designers to design a better online forms for senior citizens as well as for other users.

Based on this study, we have drilled out the problems of the existing guidelines and introduced Elder-WeFDe hybrid guidelines. For future work, we would like to suggest/recommend a guideline suitable for all categories of online forms importantly for mobile forms since m-commerce (mobile commerce) is gaining popularity. Further analysis can be conducted, applying Elder-WeFDe guideline in designing online forms for senior citizens in

different countries. There result might be able to determine whether different culture influence the significance of its results.

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