

# Tou Hsiang Kun – A Platform for Elderly and Neighborhood to Help Each Other

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**Abstract.** Tou Hsiang Kun, with the meaning of “assistance” in Minnan dialect, is a platform developed by people who help each other in communities. Society or geographical features cause the isolation in Xizhou, but it aids residents to strengthen the network of neighborhood. Hence, the relationship of mutual help is built by helping the elderly with chronic diseases or with the need for articles of daily use. Five services provided are shopping, government information, diet, repair and medical. Interactive TV and Pad are used for prototypes as well as cloud service are designed. Except for accepting assistance, elderly people who live alone can serve others at the same time.

**Keywords:** Elderly · Solitary Elders · iTv · TV · Platform · User-centered design

## 1 Introduction – Use Tou Hsiang Kun to Help the Community

This study aimed to discuss the lifestyle of elderly who lived alone in Xizhou community, Yunlin County, trying to get a better understanding on their needs through their lives. Research on lifestyle attempted to find its mutual aspect between individuals and groups. Further, the study tried to explain and expect the actions the group may take later on after getting some ideas on the particular group [1]. Because of the lack of care over a long period of time, elderly who lived alone tended to be degenerated, both mentally and physically. Therefore, the aim of the study was not only to provide the elderly who live by themselves a healthier and better life, but further to enhance their quality of life.

Five orientations included “confidence-learning,” “family-conservative,” “leisure-directed,” “society-directed” and “society-caring” could be induced by the research concerning the lifestyle of elderly [2]. Moreover, because of isolating by societies or geographical features, the elderly developed mutual care when being ill or encountering difficulties, creating powerful networks of family and neighborhood among regional residents [3]. To sum up, Social Mutual Aid, consisting of mutual identification and interdependence, was one of the basic concepts and behaviors on human society.

Community-based services provided elderly for medical and welfare needs. Communities had a variety of services; however, elderly who were desperate for those services were not able to employ them. As a veteran of social work, several reasons claimed by researchers were as follows. (1) Elderly with low level of education or acquired disability were not able to apply for services through written words. (2) Elderly didn't have much information about community services because they were unable to move freely and tended to stay at home for a long time; in addition, people who live with them were physically handicapped, or they were disadvantaged elders as well. (3) Elderly were not willing to receive social welfare services because of their temperament and negative images. (4) Elderly had no idea about social services and were not willing to accept it owing to mental retardation. (5) With the reason "don't wash your dirty linen in public," the elderly can't apply the services because they were not getting along well with family members or people who live with them. (6) Elderly were unable to take advantage of services because transportation in their domicile was inconvenient.

In addition to the reasons mentioned above that unable the elderly to obtain welfare, according to contextual approach, it found out that in Xizhou community, the rate of elderly who lived alone is higher, because farming is mostly the main industry there, resulting in high emigration of young people. Besides, the remoteness blocked the networks between Xizhou community and its community-based services. By collecting the lifestyle of the elderly who lived by themselves and contextual analysis, the neighborhood in Xizhou community tended to be "society-directed" and "society-caring." Tou Hsiang Kun, with the meaning of "assistance" in Minnan dialect, was developed to help the elderly who lived alone in Xizhou community, and to enhance community-based services and networks.

## 2 Literature Review

This study was conducted by setting up a platform for the elderly, and principles proposed by researchers were consulted as a basis of designing Tou Hsiang Kun. Therefore, known mistakes could be avoided in advance, the rate of making mistakes could be declined, and thus the feasibility of the platform could be increased. Several ideas were in common between the real platform and Tou Hsiang Kun. (1) The elderly used specific remote control to manipulate the TV screen when employing the platform. (2) By using the platform could shorten the distance between elderly people and the society. (3) The support of social activities was a key to enhance aged people's quality of life, especially those who lived alone. In that case, how to provide a TV screen that suited the elderly lived individually? This study proposed some principles based on eCAALYX Project. (1) Use concordant design and meaningful icons for the elderly so that they could distinguish them more easily. (2) Show the service functions on the interface. (3) Use simple words.

### 2.1 The VITAL Platform for Elderly

In order to understand the potential needs from aged people’s lives, the VITAL project, a European Community 6th Framework financed project, was employed in the case of the elderly in Spain [5], and its techniques were used to develop platforms and applications. Researchers believed that the support of social activities was a key; therefore, they considered the needs that elderly people may want, for example, being fond of chatting or having social contact with friends and relatives to strengthen the connection between families and the society. In addition, researchers also considered that how to enhance senior citizens’ quality of life through far-end services provided by the platform.

The remote control provided by VITAL was used to master the table of contents shown on TV screen, and a variety of social activities could be chosen. (Figure 1 Information service page and communication interface when using webcam) For example, many kinds of games were provided for encouraging elderly people to interact with other users. Besides, the system provided audio books, which could read the content of the books aloud. In addition, far-end education courses such as cooking and homemaking were provided as well. Among those functions, the “Information service and personal newspaper” is similar to the “Government information service” provided by Tou Hsiang Kun, helping the elderly be able to get information promptly. However, testers indicated that they still preferred to p-newspapers, the overall type-setting and typeface of “information service and personal newspaper” in VITAL were subject to correction, and its function was more suitable for the young.

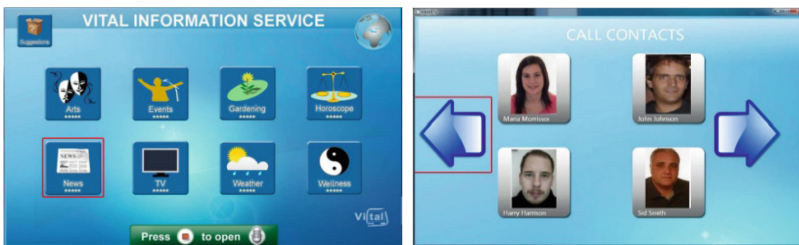


Fig. 1. Information service page and communication interface when using webcam

### 2.2 The ECAALYX Project

Previous studies showed no best suggestions on websites and TV interface specially designed for the elderly. Therefore, with persistent design, tests and the results of development, the eCAALYX project proposed some principles concerning the design of TV interface for elderly people [4]. eCAALYX (Enhanced Complete Ambient Assisted Living Experiment) is a project of European Union, with the aim to provide an overall solution for patients. Its technique was to set up the set top box at home, and the elderly could lighten their burdens by using TV to monitor their health conditions and to receive useful information about their conditions through Healthy Channel.

At the first stage of usability evaluation, with persistent design and usability evaluation, researchers got the procedures and steps needed to be revised and fitted icons by using low vision simulation model with Wizard of Oz [6]. Then researchers used the original one to carry the second stage of the test out, and discovered that the results were similar to the first test. However, in addition to the similarity, the second stage of the test not only appointed tasks more completely, but proceeded the size of the typeface and put appropriate words in each line.

After combining the usability evaluations, researchers proposed some suggestions concerning the design for the elderly, which could regard as a basis of future study. Researchers also indicated that the list would increase if there are other ways of input such as voice and gestures. Thirteen suggestions so far are as follows. (1) Minimize the number of steps it takes to reach a given screen. (2) Use consistency to facilitate recognition. (3) Make error recovery as painless as possible. (4) Reduce the information presented so users can focus on a single concept at a time. (5) Indicate current location clearly. (6) Show the current selection clearly. (7) Use meaningful icons and labels. (8) Concentrate on information at the center of the screen. (9) Use scrolling with caution. (10) Use a high contrast color. (11) Use large, sans serif and left-aligned text. (12) Use simple languages. (13) Give users time to read.

### **3 Combined Analysis on Elderly People Live Individually in Xizhou Community**

Owing to the high rate of solitary elders in Xizhou, there were many inconveniences in their lives. For example, elderly people who lived alone had difficulties obtaining government information and receiving welfare funds or food provided by the government, because Xizhou belonged to rural area, except for watching TV series, residents seldom used tech-products such as computers or smart phones. In addition, aged people lived individually were suffering from chronic diseases, and they needed long-term medical care and medicines. However, physical degeneration was unable them to move freely, which may bring some persecutions. Many problems in solitary elders' lives still remained unsolved, but some of them were regarded as mental problems, which should be improved through social interaction. For example, care. Therefore, two factors included fundamental element and lifestyle that elderly people lived individually in Xizhou community would be addressed in this study.

#### **3.1 Fundamental Element for Solitary Elders**

Two elderly people who lived alone were analyzed by interviews. For example, "How do you get along with your family members?" "How many children do you have?" "How often do you and your family get together?" "Do you close with the community?" "Do you have any experience on participating in activities in the community?" and "Whether or not you are cared by both family members and the community?" From those questions, researchers found some similarities between two participants. By considering three aspects "Family members-Care-Social groups," they also discovered

the “Questions-Influences-Actual demands” of solitary elders, and finally concluded that the potential demands the elderly want were (1) hearing (2) vision (3) communication (4) action and (5) care. (Figure 2 Fundamental Element).

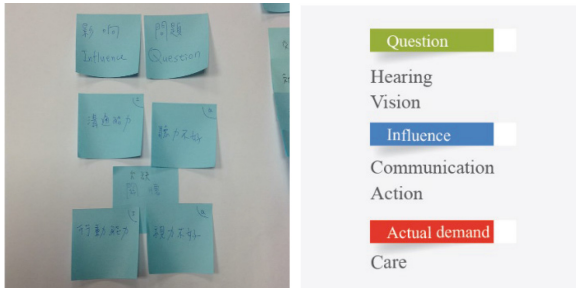


Fig. 2. 「Question- Influence- Actual demand」 The potential demand for elderly

### 3.2 Lifestyle of Solitary Elders

From the items and behaviors two participants owned, researchers came up with some aspects like food, accommodation, transportation, purchase, recreation and government organization as conception, in order to understand the motivations and goals behind elderly people’s behaviors, and to find appropriate methods to help them. To take “accommodation” as an example, senior citizens lived in three-section compound or bungalow; they may do chores such as paying fees or cleaning the house. When senior citizens who lived alone had the need concerning gas or repair, they had to contact with gas store or general contractors. But how did they carry out those actions and where did they execute the behaviors? (Figure 3) Results from the interview were induced as follows.

**Food-How to Eat Healthier?** For economic reasons, elderly people lived individually only eat lunch in a day, other meals are replaced by brewing up tea. However, it is necessary to replenish nutritious food appropriately since the physical condition of aged people is gradually degenerate.

**Accommodation-How to Find an Assistant?** It is dangerous for the elderly when items need to be repaired, since children are not allowed to accompany them. And it is difficult to find someone to give them a hand.

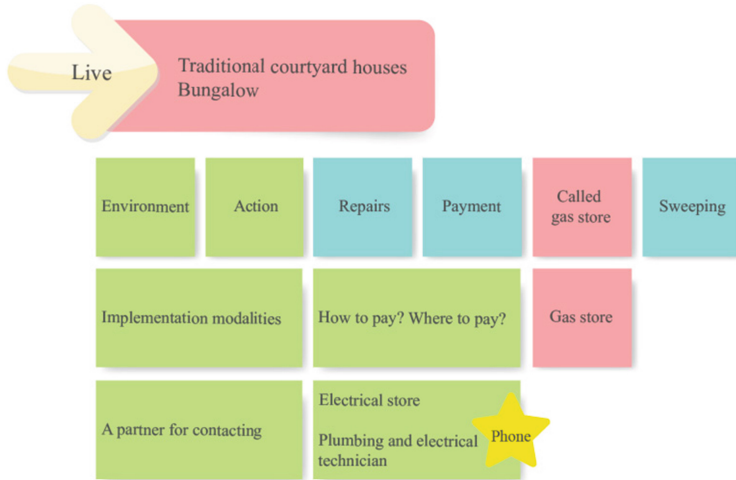
**Transportation-How to Obtain Things and Medicines in Need?** Both the participants in the interview had the experiences of going out, and the aim of being out was to get medical care or medicines for chronic diseases.

**Purchase-How to Obtain more Information or Knowledge from Markets?** For economic reasons, nonscheduled activities held in large outlets such as specific goods are on sale can lower the burden of aged people.

**Recreation-How to Shorten the Distance Between the Elderly and the Society?** Reading, watching TV and chatting with neighbors are common recreations for the

elderly who live by themselves. If the elderly haven't contacted with their children for a long time, the rate of being lack of care could be higher.

**Government Organization-How to Obtain the Latest Information from the Government?** The participants of the interview indicated that they were not informed of the information concerning receiving free food supply. Though the government has tried its best to take care of people with low income, it's a pity that elderly people can't get supplies and information in time.



**Fig. 3.** An example of accommodation, consisting of several considerations such as environment, actions, behaviors, locations, and people the elderly may contact with.

### 3.3 The Idea of Tou Hsiang Kun

After discussion, researchers believed that transportation was not the priority problem, since the elderly seldom go out after physically degenerated. To aged people who live alone, interacting with residents is their recreation. Therefore, the demand of recreation was combined to other items. While solving the problems of food, accommodation, purchase and government organization, the aim should let the elderly able to interact with the society. Based on the definition of fundamental elements, the platform should flexibly adjust to aged people's vision and hearing; and it should function as communication, action and care while the service is provided. (Figure 4 fundamental elements and lifestyle of the elderly).

## 4 The Platform of Tou Hsiang Kun

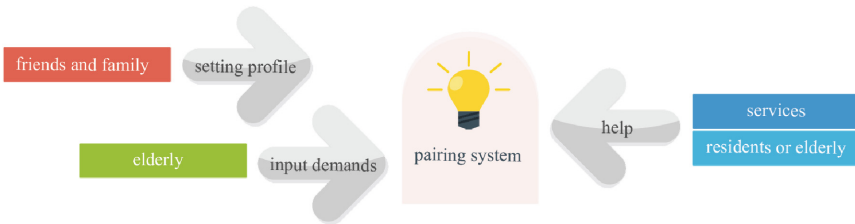
From the interview, researchers found that in Xizhou community, interpersonal cooperation does exist. Therefore, building the platform there will have a great effect on helping residents. People in the community could use the demand-service matching



**Fig. 4.** Fundamental elements and lifestyle of the elderly

function, which can not only help them obtain the goods they need, but provide services to the elderly who need help. Thus, the opportunities of getting assistance for aged people will be increased.

To operate the system, first of all, ask relatives to help the elderly set up personal information, and then the elderly put their demands in the system, which will search for the appropriate assistant and provide services to them. The helper could be another senior or residents from different ages. (Figure 5 Basic procedures of Tou Hsiang Kun) Therefore, while using Tou Hsiang Kun, the elderly live individually will be a helper and the cared at the same time.



**Fig. 5.** Basic procedures of Tou Hsiang Kun. Personal information will be asked to fill in for the first time of use. Then, all the elderly need to do is to put their demands in the system, through matching to find a helper (another elderly person or resident in the community).

#### 4.1 Matching Service/Information Service

The system will start matching as soon as demands are inputted. If the user is able to purchase the goods on his/her own, the system will show the information of the item nearby, and the elderly can decide to buy it or not. If the user needs a helper, then the system will find someone who is suitable for him/her. After successfully matched, the helper can decide to call the elderly or not after the demand shown on his/her cell phone. (Figure 6 Service of Tou Hsiang Kun) Both parties will discuss about the goods need to be purchased, the number of the specific product and delivery location by phone. The helper delivers the goods and the elder person pays for the product



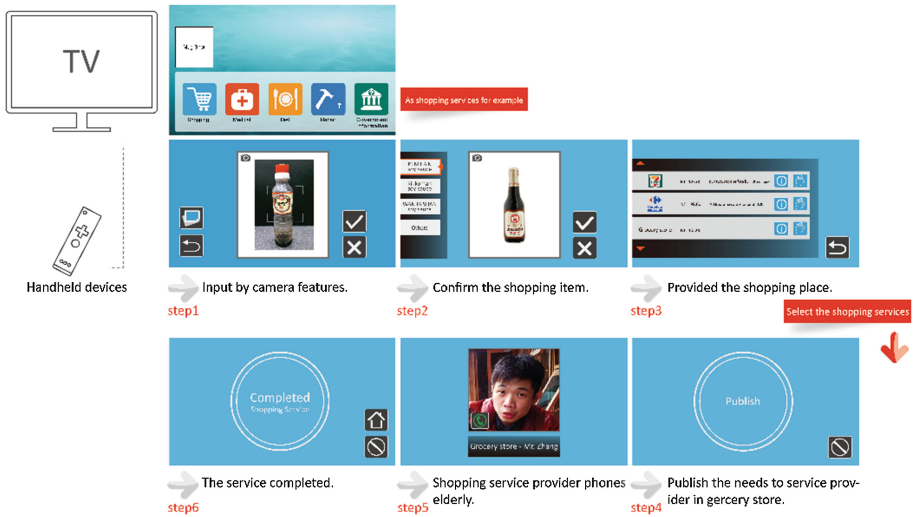
**Fig. 6.** After inputting their demands, matching service or information service will be shown on the interface. Then the system helps to find a helper, and communication through phones between both parties will be developed.

simultaneously, and the interpersonal interaction between the elderly and the society works.

**4.2 Prototype Design-Personal/in-Shop Device**

The system is divided into cared-end and service-end, and six services are provided for the elderly, including (1) service (2) purchase (3) medical care (4) diet (5) household maintenance and (6) government information. Household TV is commonly used and widely accepted by elderly people; therefore, the instrument chose household TV as a platform of conveying messages, and handheld device is employed as a combination of telephone and remote control, which also provides photographic function, so that the user can take a photo of the goods and input it into the system. (Figure 7 Operating procedures of Tou Hsiang Kun, taking purchase as an example).

The service-end is divided into personal and in-shop. Personal mobile device (also called smart phones) receives demands released by the elderly through APP, if it can provide the service; users can hold conversations by a simple click. In-shop device is



**Fig. 7.** Operating procedures of Tou Hsiang Kun, taking purchase as an example



installed in the tablet, which is put on the checkout counter. When residents finish purchasing and come to the checkout counter, they can see the goods that need to be purchased. If they are willing to help, just click “I can help” bottom, then the elderly in need can be helped in time.

## 5 Test on Tou Hsiang Kun

Backed to the manipulation of users from the system and through the interview and generalization, researchers aimed to see if the interface and operation performance of Tou Hsiang Kun are suitable for elderly people’s actual conditions and lifestyle; besides, how is the acceptance of household TV, which is used as a media for the elderly? Two stages of evaluation would be tested, and the results would be regarded as a basis of revising the procedures and system in the future.

### 5.1 Stage 1-Experts’ Evaluation

First stage of evaluation was made by experts before the system tested by the elderly in Xizhou community. They indicated that choosing TVs as the media is suitable for the elderly. However, TVs are different from cell phones and tablets, so the manipulation of the system should fit with household TV, and the interface of TV should adjust to future operation as well. Besides, researchers could provide the design of interface that more suit TVs while switching the items or pages. To sum up, the design of interface of Tou Hsiang Kun should fit household TV, with which can correspond manipulation naturally. And the designing of handheld device derived from the remote control should be improved to fit operation of the interface.

### 5.2 Stage 2-Actual Usage by the Elderly

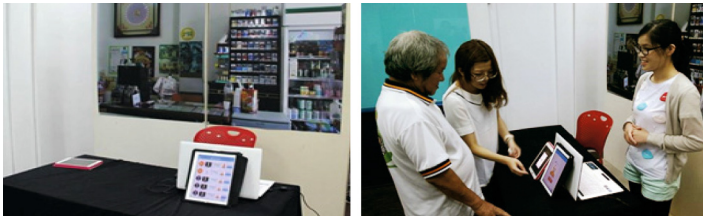
Researchers invited the president of Xizhou community and two participants as the users of the test. TV was replaced by touch screen, and handheld device was replaced by touch pen and wii. Both the shop and the helper were equipped with a tablet and a smart phone, and a notebook was used to deal with the feedback. Two scenarios included living-room and in-shop were set up in the test. The procedures and video records would be elaborated in the following session.

**Scenario 1-Living Room.** Researchers made demonstrations to the elderly on how to operate the system. Three elderly people played the role of the cared, photographing the goods in the scenario and inputted them to the system, completing three tasks on buying tissues, designating buying goods, and dispensing medicines. Through the test, researchers could find mistakes and check if any procedures need to be improved. (Figure 8).

**Scenario 2-In-shop.** The elderly played the role as a helper, buying salt through the tablet set up in the store (Fig. 9). By being a helper, the elderly could get more understanding on the operation of the platform, and mistakes found in the test would have great help in future development.



**Fig. 8.** Demonstrations on the operation and instruments used in the test, including the screen, touch pen, and remote control.



**Fig. 9.** Demonstrations on how to help the elderly buying goods through the platform in in-shop scenario.

## 6 Conclusion

After the test, all three participants indicated that they were willing to use the system. They suggested that it is convenient to obtain goods and dispense medicines through Tou Hsiang Kun when people are unable to move freely or go out. However, the prototype design of Tou Hsiang Kun still needs improvements. Based on the first and second stages of evaluation and suggestions, corrections on the device are as follows.

**(1) Use Daily Goods to Design the Interface Icons.** Icons on the interface are easy to understand, but few are expressed unclearly; therefore, the choice of icons should close to the elderly people's lifestyle and fit with their cognition and experiences, designing easily distinguished icons for the elderly.

**(2) The Design Should Fit in with TV Interface While Switching Items or Pages.** Experts suggested that household TV fits elderly people's lifestyle. However, it is different from cell phones and tablets, so the interface of TV and the appearance of the interface should adjust to future operation. Besides, while switching items or pages, the design of interface should be more suitable for TV.

**(3) Improvement on Handheld Device Which Derived from Remote Control of TV.** Tou Hsiang Kun used household TV as the handheld device, but it should be designed based on the operation on the interface.

**(4) Create more Realistic Scenarios on the test.** Interface and hardware should closer to real operations, so that the elderly could get more experiences and feedbacks. During the test, wireless control was replaced by touch pen, but the effectiveness was low because the user was not familiar with the timing and power while clicking.

Therefore, it is necessary to adjust handheld device from household TV to wireless sensor or rocker, increasing the distance and space without touching the screen, and enhancing the operation experience.

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