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The development of a Thai sign language dictionary program for pocket PCs

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ABSTRACT: The main reasons for undertaking this project were, namely: to develop a Thai sign-language dictionary program for pocket PCs; to have experts evaluate its quality; and to determine the level of satisfaction by sample users. The program was developed using *Embedded Visual Basic 3.0* tools in order to manage all of the data and display procedures, *Microsoft Access 2002* to create and save the database, *Microsoft ActiveSync 3.5* to provide connectivity between a computer and a pocket PC, *Adobe Premiere 6.5* to edit and create characters on video; *FX Video Converter* was also used to encode video. After its development, the program was tested by seven experts and 50 sample users so as to determine its quality and satisfaction towards the program. The quality evaluation results evaluated by the experts showed that it had an average score of 4.37, which is considered a good level. The user satisfaction towards the program had an average score of 4.29 and is considered a good level as well.

INTRODUCTION

Computers have been playing an increasing and significant role in today's societies, whether it is in the academic profession, health care services or communications. At first, it was presumed that most of the purposes in using computer were to facilitate activities, such as researching, approaching or facilitating presentations. The preceding statement took only one view of the purposes of the regular use of computer for ordinary people. In fact, the computer can perform a variety of tasks. It has been prevalently adapted, not only for everyday people, but also to children, adults as well as disabled.

As the name implies, multimedia comprises many kinds of media, including sound, text, image, animation and video. From the authors' intensive research, most people typically view multimedia capabilities for entertainment pursuits or fulfilling obligations such as making attractive presentations. However, generally, multimedia provides greater benefits than just entertainment pursuits.

Multimedia satisfies unique requirements that enable people to develop their society in many aspects. In this sense, multimedia implies the ability to communicate in the media best suited to the special individual and special circumstance, and to combine flexibly various media in a limitless range of education and training [1-4].

For disabled people, in particular, the advent of multimedia can be powerfully liberating, helping to overcome many of the barriers that have made communication and information inaccessible in the past [5]. Statistical research has revealed that there are 165,690 hearing impaired children, with up to 159,993 being of school-age, who do not have school education. This amount is very significant and it is a very high concern.

Pocket PCs

A pocket PC has become widely recognised and utilised. Its capacity is similar to personal computer (PC). Foreseeing the benefit of pocket PCs in this respect, the researchers sought to develop a Thai Sign Language Dictionary for pocket PCs so as to promote better understanding between two communicators, especially comprising a hearing impaired person and a person with no such impairment.

Additionally, the researchers also aimed to foster sign language skills for ordinary beginners who want to learn sign language. It is believed that those who are capable of mastering the Thai Sign Language Dictionary for the pocket PC can bridge the communication gap between hearing impaired people and non-hearing impaired people. It is believed that this would also bring about a better standard of living to people in society as a whole.

METHODOLOGY AND DATA ANALYSIS

Methodology

The researchers determined the content, scope and design of the program to be developed and extended from the existing program. The objective of development was to integrate potential benefits to end users as much as possible. In this case, experts and sign linguists were also consulted.

With regard to program design, the researchers divided program designing into two systems as follows:

- The *user interface system*: the researchers utilised Microsoft *Embedded Visual Basic* in developing the system because the program allows for the application to be developed on pocket PCs.

- *Initialisation* and the *looping system*: the system was controlled by Microsoft *Embedded Visual Basic* because the program offers features and capabilities that are suitable for pocket PCs.
- Experts assessed the implementation and evaluation tools. The assessment test was specifically designed as the tool for evaluation. The test was adopted a specific approach to collect particular data concerning techniques. The collected data was statistically translated to find means.
- The satisfaction evaluation tool was assessed by users. This satisfaction test was specifically designed to collect data from users specifying general points of view of the users towards the performance of the program. The satisfaction scores were collected using statistical methods.
- *Program structure*: The basic structure of the Thai Sign Language on Pocket PC was designed into 4 main sections that are searching entry, basic conversation, personal entry, and reference. And there is a tab bar on bottom of the screen allowing users to intuitively switch between Thai and English.
- The *Search* menu provides four choices as follows:

  - The *Quick* feature searches words by typing a single target word in the searching box, for example, by typing the word 'ส้ม (*orange*)' in the search box, the result gives all of the words where 'ส้ม (*orange*)' appears at the beginning (see Figure 1 for a related example);
  - The *All or Part of the Word* feature works in the same manner as the *Quick* feature, but it finds part of the target words in the search box that appears either in the first, middle or other part of the words, for example, after typing the word ส้ม (*orange*), the result shows ส้ม ส้มโอ สีส้ม;
  - The *Category* feature helps to find groups of words that have been categorised into 21 features;
  - The index finds words in alphabetical order; this is ก - ฮ in the Thai language.

- *Basic conversation*: The researchers categorised the type of search words into 10 sections. Users can access the target words according to the meaning that falls into related section (see Figure 2).
- *Personal entry* is a special add-on feature that is especially designed for the user to freely add or delete personal entries or definitions. Users can access the add-on feature via the *Search* menu. When adding or deleting, the program traces back to database and performs the task according to the user's commands, which are either *record* or *delete*.

DATA GATHERING METHODOLOGY

The data for the research had been grouped into two categories, namely: data on quality and data on satisfaction. The researchers engaged groups of people to gather specific information. The groups are as follows:

- Experts' group: there were seven experts from the Sensation School (under patronage of His Majesty the King);
- Students and people who participated in the 6th *Computer Program Development Contest of Thailand*, held from 3-5 January 2004, which was organised by the National Electronics and Computer Technology Centre (NECTEC), as well as hearing impaired people and people who are related to, or have a relationship with, hearing impaired people at the Sensation School.

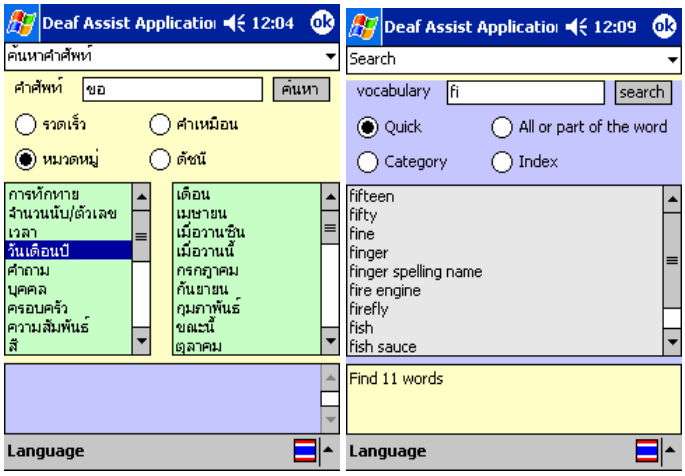

Figure 1: Sample of the *find* entry menu screen by searching the word *fi*.

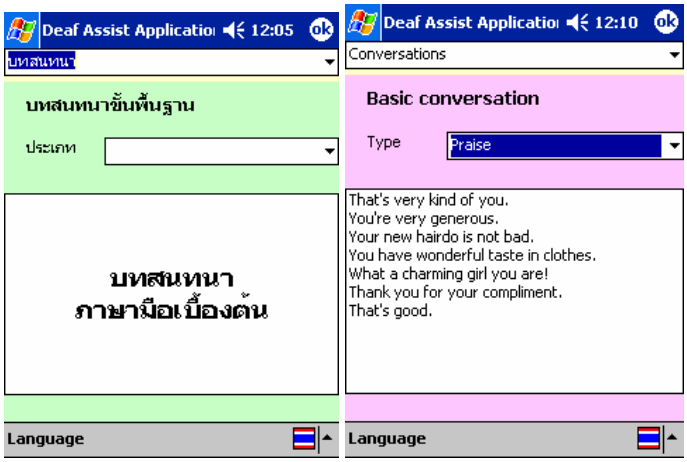

Figure 2: Sample of the basic conversation screen.

People and Sample Group

The people involved in this study comprised hearing impaired people and people who were interested in the program of Thai sign language for a pocket PC.

The samples covered the two groups of people. The first group involved students and people who participated in the 6th *Computer Program Development Contest of Thailand*. The other groups comprised hearing impaired people and people who are related to, or have a relationship with, hearing impaired people at the Sensation School. Sampling was carried out by selecting 50 people who had viewed and accessed the Thai Sign Language Dictionary Program developed for pocket PCs.

Data Analysis Methodology

The data analysis methodology was as follows:

- Analysis of the quality of the program was achieved by calculating the value of the score for each key area collected from experts in order to find the statistical means, then calculating the means to the find total means

for each key area. The key areas were presentation area, utilising area and others.

- Analysis of users' satisfaction was carried out by calculating the data collected from the 50 sampled users so as to find the means for each key area. The key areas were presentation area, utilising area and others.
- The statistical methodologies that were used sought to ensure that the evaluation result was creditable and useful. The researchers emphasised finding statistically significant means in order to compare to the criterion scores and standard deviation.

Data Analysis Results

Table 1 shows the means, standard deviation and quality levels of the Thai Sign-Language Dictionary Program Developed for pocket PCs as evaluated by the sample groups.

Table 2 shows the means, standard deviation and quality levels of the Thai Sign-Language Dictionary Program developed for pocket PCs as evaluated by the experts.

SUMMARY

The results of the quality evaluation as assessed by the experts and the satisfaction of users towards the Thai Sign Language Dictionary Program developed for pocket PCs evaluated by users revealed the following information.

The statistical results listed in Table 1 give the evaluation results from the sample groups and demonstrate that the Thai Sign Language Dictionary Program for pocket PCs possesses quality at a good level.

Table 2 shows the evaluation results from the experts, which demonstrate that the Thai Sign Language Dictionary Program for pocket PCs possesses quality at a good level as well.

REFERENCES

1. Wu, C-H. and Irwin, J.D., *Emerging Multimedia Computer Communication Technologies*. Upper Saddle River: Prentice Hall (1998).
2. Rysavy, S.D.M. and Sales, G.C., Cooperative learning in computer-based instruction. *Educational Technology Research & Development*, 39, **2**, 70-79 (1991).
3. Newman, W.M. and Lamming, M.G., *Interactive System Design*. New York: Addison-Wesley (1995).
4. White, T., *The Animator's Workbook*. New York: Watson-Guptill (1988).
5. Fleming, B. and Dobbs, D., *Animating Facial Features and Expressions*. Rockland: Charles River Media (1999).

Table 1: The evaluation results of the program from the sample groups.

Areas of Evaluation	Mean	S.D.	Quality Level
Presentation			
Alphabet:			
1. Simplicity and resolution	4.43	0.53	Good
2. Attractiveness	4.57	0.53	Very Good
3. Colour suitability	4.00	0.58	Good
4. Positioning suitability	4.14	0.38	Good
5. Correctness of wording	4.50	0.53	Very Good
Video Image:			
1. Size suitability	4.29	0.49	Good
2. Resolution of sign language in video image	4.29	0.76	Good
3. Suitability of video image and meaning	4.00	0.00	Good
4. Positioning of video image	4.57	0.53	Very Good
Utility			
Program Interaction:			
1. Interaction with the program	4.29	0.76	Good
2. Ease of program control	4.29	0.49	Good
3. Sameness of the standard of interactive pattern	4.00	0.82	Good
Program Quality:			
1. Program speed	4.43	0.53	Good
2. Timing of the showing of the video image	3.71	0.49	Good
Usefulness of utilising the program			
1. Enhancing skills and understanding of sign language	4.57	0.53	Very Good
2. Enabling communication with hearing impaired people	4.29	0.49	Good
Other Areas:			
1. Suitability of composition between video image and wording	4.57	0.53	Very Good
2. Sameness of the standard of the screens	4.43	0.53	Good
3. Program overall	4.71	0.49	Very Good
Total means	4.37	0.53	Good

Table 2: The evaluation results of the program from the experts.

Areas of Evaluation	Mean	S.D.	Quality Level
Presentation			
Alphabet:			
1. Simplicity and resolution	4.36	0.63	Good
2. Attractiveness	4.12	0.63	Good
3. Colour suitability	4.16	0.58	Good
4. Positioning suitability	4.48	0.53	Good
5. Correctness of wording	4.44	0.58	Good
Video Image:			
1. Size suitability	4.32	0.68	Good
2. Resolution of sign language in video image	4.08	0.83	Good
3. Suitability of video image and meaning	4.18	0.56	Good
4. Positioning of video image	4.40	0.57	Good
Utility			
Program Interaction:			
1. Interaction with the program	4.34	0.63	Good
2. Ease of program control	4.24	0.77	Good
3. Sameness of the standard of interactive pattern	4.22	0.65	Good
Program Quality:			
1. Program speed	4.22	0.65	Good
2. Timing of the showing of the video image	3.92	0.70	Good
Usefulness of utilising the program			
1. Enhancing skills and understanding of sign language	4.24	0.62	Good
2. Enabling communication with hearing impaired people	4.42	0.64	Good
Other Areas:			
1. Suitability of composition between video image and wording	4.24	0.62	Good
2. Sameness of the standard of the screens	4.34	0.56	Good
3. Program overall	4.46	0.50	Good
Total means	4.29	0.61	Good