

Contents lists available at [ScienceDirect](#)

Kasetsart Journal of Social Sciences

journal homepage: <http://www.elsevier.com/locate/kjss>

Acceptance factors for the use of video call via smartphone by blind people

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ARTICLE INFO

Article history:

Received 20 October 2015

Received in revised form 20 February 2016

Accepted 24 February 2016

Available online xxxx

Keywords:

blind people

smartphone

technology acceptance model

video call

ABSTRACT

Using video call via smartphones is a new technology for blind people which can be applied to facilitate their daily lives. This video call technology is different from old technology and the technology acceptance has changed users' behavior in society, culture, and especially attitude toward using new technology. This research studied the intention and the need to use video call via smartphone by blind people according to the Technology Acceptance Model, a famous and widely-accepted theory for the indication of the intention to use technology. The survey data collected from a sample of 30 blind people who lived in the Bangkok Metropolitan Region and used smartphones in their daily life were analyzed using Pearson's Correlation Coefficient. The results found the perceived ease of use factor and the perceived usefulness factor have similar direction and relation. These two factors also have similar roles and relation to the attitude toward using and behavioral intention to use video call via smartphone in the daily life of blind people. The group of blind people who had not experienced using video call via smartphone had similar direction and relation in technology acceptance at a higher level than the group of blind people who had experienced except for the relation between the attitude toward using factor and the behavioral intention to use factor.

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Introduction

Presently, humans are experiencing more problems with vision. Such issues are caused by the deterioration and degeneration of eyes resulting from disease, accidents, ageing or the improper use of eyes in an inappropriate environment. According to the statistics of the World Health Organization (WHO), in 2002, it was estimated that globally, there were 37 million blind people and as many as 124 million people with low vision. Ninety percent of them were from developing countries. Furthermore, 82 percent of blind people were aged 50 years or older. In addition, the World Health Organization estimates that in 2020, the

number of blind people will increase to 46 million (Pornmanuchatip, 2010).

Such an increase in number is the main reason the current study adopted the approach of helping blind people through the use of video call via smartphone. Assistive technology has been developed which is suited to each type of disability and allows disabled people to have more mobility and independence in their daily life (Chonlatanon, 2002). Such technology can be basic or advanced; for example, a mobile phone which has big numbers and letters on the buttons so that people with low vision can use it or a mobile phone which uses a speech synthesis system to allow blind people to perceive and access various functions (Phuntachat, 2004). Nowadays, communication technologies play an inevitably important role in our daily lives. Technological development has advanced rapidly—it

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Peer review under responsibility of Kasetsart University.

<http://dx.doi.org/10.1016/j.kjss.2016.02.001>

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Please cite this article in press as: Chanjaraspong, T., Acceptance factors for the use of video call via smartphone by blind people, *Kasetsart Journal of Social Sciences* (2016), <http://dx.doi.org/10.1016/j.kjss.2016.02.001>

changes our daily lives and makes us more comfortable. Mobile phones have become important, every-day gadgets for communication and data exchange. They have been developed to become more efficient (Chumchu, 2012) and have evolved into the smartphones that we see today. Smartphones have greater abilities than a normal phone; they can be compared to portable computers with operating systems that work together with applications to enhance performance and offer diverse services which suit users' needs better (Prakrobtum & Ajchariyakiat, 2012). Most importantly, these days, smartphones have been developed to enable blind people to access and use a screen reader program through the operating system of the smartphone without any additional expense. The operating systems are also widely used such as iOS and Android. As a result, blind people can use iPhones or smartphones more conveniently when they have these operating systems (Jayant, 2010). Also, according to the study, it was discovered that the use of video call via smartphone can be applied to help blind people in various aspects (Maneesaeng, Punyabukkana, & Suchato, 2015), including navigation, reading messages, giving information about colors and patterns of clothes or other types of assistance offered by helpers who describe the pictures from video calls via an online social network (Lasecki, Thiha, Zhong, Brady, & Bigham, 2013). The use of video call via smartphone is a new technology which has been applied to facilitate a blind person's daily life. This technology is different from the old technological facilities. In addition, since acceptance is important for the construction of behavioral change which will also result in social and cultural change in a way that affects the use of innovation, this research studied the intention and the need to use video call via smartphone by blind people according to the Technology Acceptance Model (TAM), a famous and widely-accepted theory for the indication of the intention to use technology (Davis, 1989). The acceptance factors for using video call via smartphone by blind people were studied.

Literature Review

Use of Smartphones by Blind People

Nick Bilton interviewed Dorrie Rush, the Marketing Director of Accessible Technology, an agency for vision rehabilitation and education for the blind. She mentioned that the old belief that the use of communication technology for blind people must be concerned with devices that blind people can perceive through their sense of touch has become obsolete. In the past, blind people had to use mobile phones which had small buttons and a small screen. Later on, the early iPhone model was developed with big fonts for those who were visually impaired. In 2009, iPhone was further developed to enable blind people to use it more conveniently by providing the gesture-based screen reader or the voiceover program. When the fingers of the user were moved back and forth on the screen, there would be a notification sound with each program. Also, the use of fingers in different manners enabled a user to use the phone more easily. Such technology also allowed blind

people to read and write messages (Bilton, 2013). Subsequently, Google (the developer of the Android operating system) installed the screen reading program called "Talkback" which enabled the blind to use smartphones as well (Bilton, 2013).

Concepts to Help Blind People Use a Smartphone

Hestnes, Brooks, and Heiestad (2006) reported an experiment in 2005 to send video signals and voices from mobile phones by the 3G network system to test the resolution and detail of video images which were sent at high speed. The research was carried out with a sample of 10 blind people and 10 helpers who provided them with information from the videos that they saw. Everyone used a mobile phone which had a video camera and could receive and send internet signals. The experiment tested the usage in daily life at work and at home, including trips to various places such as to help check the colors of clothes to make sure they matched, to help look at merchandises in supermarkets or to help describe surroundings. The results of the test revealed that the resolution and the size of images as well as the internet signal were the important factors which provide efficient usage (Hestnes et al., 2006). In April, 2012, Janet Ingber wrote an article to introduce three Object Identify Application programs: VizWiz, Digit-Eyes, and LookTel Recognizer. These programs were used in iPhones and had similar objectives to describe pictures for blind people. VizWiz was a free program and was easy to use. A user only had to take a picture and add a voice recording asking a question about the picture and send the data to the helper who could be a volunteer, a friend in online social networks (Facebook, Twitter), an e-mail contact or software for picture identification (IQ Engine). Digit-Eyes by Digital Miracles L.L.C. was a program for scanning bar codes and providing descriptions of images by voice. It was applicable to Universal Product Codes (UPC) or European Article Numbers (EAN). Moreover, it could create its own bar codes. This program cost USD 29.99. Finally, LookTel Recognizer's recognition system could select objects from pre-recorded pictures and audio files which described the pictures. It could also be used to scan bar codes. This program was sold for USD 9.99 (Ingber, 2012). Later, in July 2013, Bill Holton wrote an article to recommend additional Object Identify Application programs which were used with iPhones. They were TapTapSee, CamFind, and Talking Goggles. TapTapSee still required a human helper to help describe pictures, unlike Talking Goggles which used OCR (Optical Character Recognition) and therefore, was able to better describe texts from labels or publications (Holton, 2013). Additionally, the CamFind program could display the data of the identified objects, including the details of such objects, places of distribution, maps, price comparisons, and promotional videos.

Nevertheless, the programs mentioned above were used to identify an object from a still image and to send the data back to the sender of the image, which might take a while before the answer was available. Furthermore, sometimes the answer did not correspond to the user's need due to the lack of real-time interaction between the sender and the provider of the data (Ingber, 2012). For example, a blind

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