



Assessing the Willingness of Elder Users in Using Virtual and Augmented Reality Technologies

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Introduction

- The aim of our work is to determine, the factors that facilitate the use of emerging technologies by elder users, in order to empower the use of such technologies by the elderly through the design of VR / AR applications that suit the needs of elder users.
- The ultimate aim of this effort is to develop contemporary emerging technology applications that provide high levels of user experience to elderly users. Towards this end, we run a series of evaluations to determine the factors that influence the use of emerging technologies by older users.
- The design of the experiment is based on a three-stage hierarchical structure where in each step the participants are exposed to more technologically intensive interaction styles.

Literature Review

The use of emerging technologies by the elder people is becoming increasingly important, especially in periods of social isolation caused either by external factors (i.e. a pandemic) or by internal factors associated with reduced mobility in the elderly (Tomaka, Thompson & Palacios, 2006).

Elder people experience a decline in many characteristics that may prevent them from using effectively emerging technologies like Virtual and Augmented Reality that rely on the activation of numerous senses.

- a. mobility (Bähr et al., 2013)
- b. eyesight (Zavlanou and Lanitis, 2016)
- c. hearing loss (Payne and Isaacs, 2017)
- d. cognitive decline (Borelli, Grennan, and Muth, 2020)

Experimental Evaluation

Stage 1

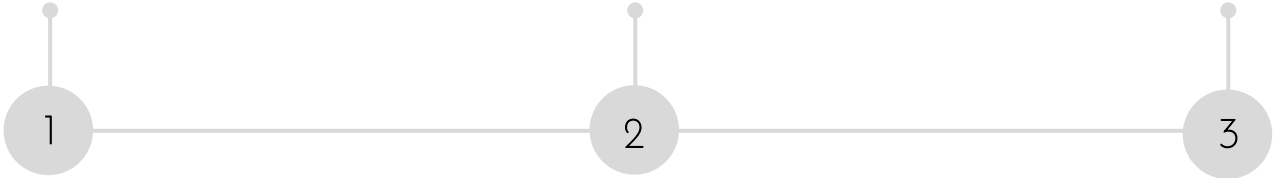
User reviews analyzed from common application

Stage 2

More specialized application with specific target group

Stage 3

High-tech enviroment, with user immersion



Stage 1: Analysis of user reviews of a Smartphone application

Aim:

- To determine the most important design-related factors that motivate the target group to use a smartphone application.

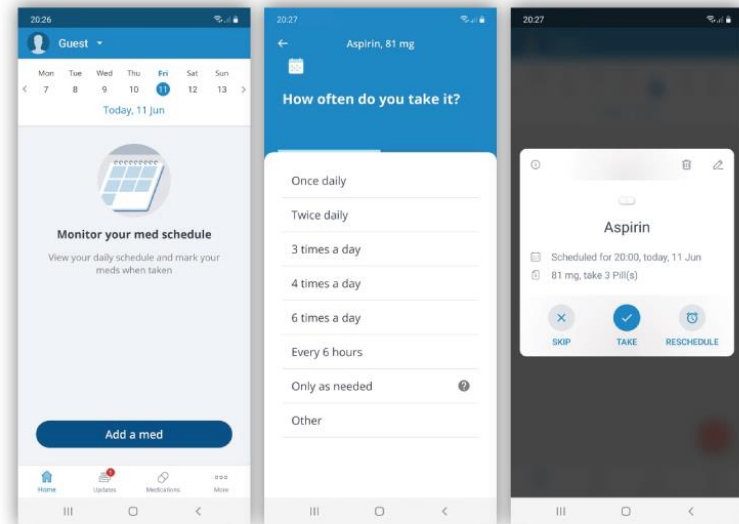
Description:

- Application used for evaluation: Pill Reminder and Medication Tracker by Medisafe
- Software used for data collection: Appbot

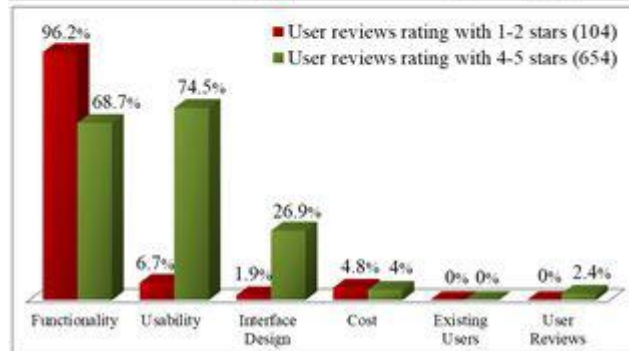
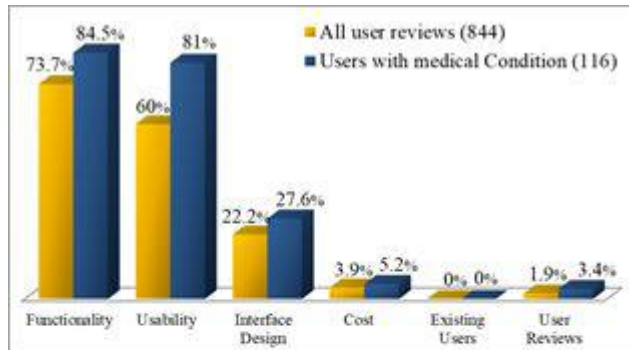
Stage 1: Analysis of user reviews of a Smartphone application

Experimental Set-up:

- Collected 1000 user reviews
- 116 users with medical condition
- 104 dissatisfied users
- 654 satisfied users



Stage 1: Analysis of user reviews of a Smartphone application



Results:

- Functionality, usability and interface design are the most important factors for users.
- Cost, number of existing users and user reviews do not seem to be important issues in all user reviews considered.

Stage 1: Analysis of user reviews of a Smartphone application

Conclusions:

The results indicate that to attract users to use an application the most important factors are the actual usefulness of the application (functionality), the usability, and the interface design. Also, there was no noticeable difference in these observations between the groups of people with or without health issues.

Stage 2: Evaluation of a pilot application that requires camera-based interaction

Aim:

- Investigate the reaction of the target group in more technologically demanding application.
- Incorporates the use of the camera and audio-visual feedback.

Description:

- This experiment is based on the Easypharm application, which is an easy-to-use drug management application.

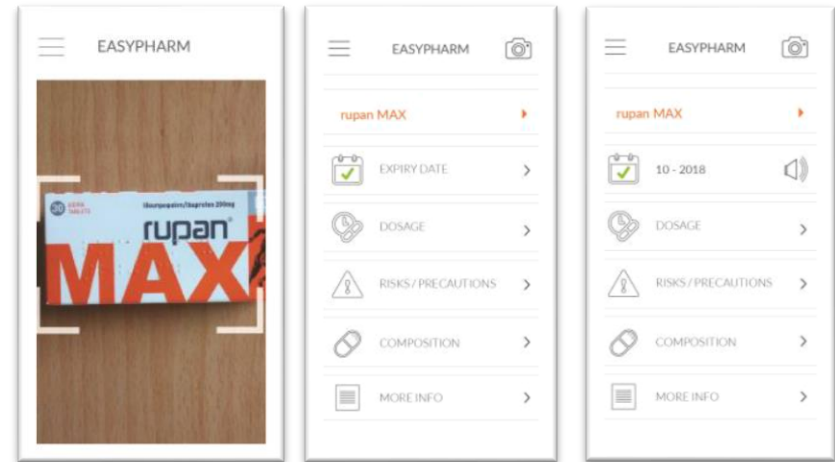
Stage 2: Evaluation of a pilot application that requires camera-based interaction

Experimental Set-up:

- 15 participants (6 male , 9 female)
- Aged between 50 to 70 years
- Evaluation according to a scenario.

Users, first had to scan the medicine package in front of them and then read and hear information about the expiration date of the package.

- Questionnaire after evaluation



Stage 2: Evaluation of a pilot application that requires camera-based interaction

<i>Indicative questions used during the evaluation of "Easypharm"</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>
Q1. The overall response to the application was satisfactory.	33%	60%	7%
Q2. It was difficult to read the characters on the screen.	-	13%	87%
Q3. The application information organization was clear.	33%	60%	7%
Q4. The text in the application was readable.	33%	53%	14%
Q5. It was easy to remember the information displayed on the screen.	33%	60%	7%
Q6. Implementing actions in the application was complex.	7%	7%	86%
Q7. The application was designed to compete with the needs of users.	33%	60%	7%
Q8. I was able to quickly complete the tasks and scripts using the application.	33%	53%	14%
Q9. The information contained in the application is clear.	33%	60%	7%
Q10. I would like to use the application in my everyday life.	33%	53%	14%
Q11. Which parameters will make you use this type of app: functionality, usability, design, cost, existing users, and reviews.	-	-	-

Results:

- Most important factors that make users use the application are the functionality, usability, and interface design.
- The target group that was evaluated is willing and would be interested to learn more and use on daily basis more.

Stage 2: Evaluation of a pilot application that requires camera-based interaction

Conclusions:

- people over the age of 65 are less familiar with new applications and need more time to adapt to new interfaces.
- users are willing to use a more technologically intensive application as long as the factors of functionality, usability, and interface design are covered

Stage 3: Evaluation of the use of a virtual reality application by the elderly

Aim:

- The aim of the experiment was to test the reactions of elderly towards the use of a virtual reality application.
- Incorporates the use of the camera and audio-visual feedback.

Description:

- Application: "First Aid Training"
- Equipment: Oculus Go VR Headset



Stage 3: Evaluation of the use of a virtual reality application by the elderly

Experimental Set Up:

- 10 participants
- Aged between 50 to 70 years
- Evaluation according to a scenario
- Pre and post questionnaires



Stage 3: Evaluation of the use of a virtual reality application by the elderly

<i>Before using virtual reality</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>
B1. I believe that VR applications are intended for entertainment.	90%	-	10%
B 2. I believe that using VR can improve my daily life.	30%	10%	60%
B3. I believe that I can integrate the use of VR in my daily routine.	10%	10%	80%
B4. I would like to use the VR to practice on health issues.	60%	10%	30%
B5. I think the VR is useful for older people.	20%	40%	40%
<i>After using virtual reality</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>
C1. It was easy for me to navigate the VR area.	60%	30%	10%
C2. My experience with the VR was enjoyable.	90%	10%	-
C3. I believe that I have learned about the resuscitation position.	60%	30%	10%
C4. The experience in the VR makes me dizzy.	40%	10%	50%
C5. I had a hard time figuring out what to do.	60%	10%	30%
C6. I managed to complete the process.	90%	-	10%
C7. I would like to use the VR to practice on health issues.	70%	20%	10%
C8. I think the VR is useful for older people.	50%	30%	20%

Results:

- The participants used virtual reality for the first time and yet would like to practice using it to learn about health issues.
- 30% initially disagreed on whether is it useful to use virtual reality to practice on health issues, while after the use of the VR application, this figure dropped to 10%.

Stage 3: Evaluation of the use of a virtual reality application by the elderly

Conclusions:

- Target group believed that VR was mainly for fun but after using the application, they thought it was useful for their own needs and they see the possibilities it offers to them.
- Willing to incorporate VR in their everyday activities.
- VR experience requires the purchase of equipment to use virtual reality.

Conclusions

- Based on the results, we conclude that older people are not put off by the prospect of using more technologically advanced technologies as long as the requirements of functionality, usability and design are met.
- Furthermore, in the case of new technologies, it is important to provide training, as this will allow elder people to realize the full; potential offered by emerging technologies.
- Covering these needs of the users, then they can use VR and AR applications on a daily basis with satisfaction.

Future Plans

- Based on the outcome of our experiments
- Based on literature search related to VR applications useful for elderly
 - Define suitable scenario
 - Implement/ application
 - Evaluate application and impact
 - Disseminate

Thank you