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Dementia - stimulation of memories

Maria Pedro[1], Ana Costa[2] and Lígia Lopes[3]

[1]*University of Porto, Portugal*

[2]*Design Includes You Association, Portugal*

[3]*University of Porto, Portugal*

Abstract

This paper will describe a design project that has as its main purpose the research and product development which will contribute to improvement in the life quality of people with dementia. Dementia is a neurological disease that causes different symptoms like memory problems, affecting the patient's daily life and their relations with others. This design product intends to contribute to the training and stimulation of memory as well as to promote a better interaction between people with dementia and their family and carers.

This project comes from the collaboration between FEUP and Lar Almeida Costa from Santa Casa da Misericórdia de Gaia, – a nursing home and day care centre for the elderly – which provided us a crucial information for the development of this project, regarding dementia and all related subjects. This collaboration allowed the practice of an intensive research, through observation and participatory activities with people with dementia - those activities served like stimulation with the purpose of reducing memory loss, among other symptoms. The activities were performed all throughout the project, researching and receiving feedbacks from the initial design project proposal. This process helps us to adjust the relation between the object and users needs, trying different concepts and approaches, and finally the validation of the final product.

This paper shows all stages of product design development: understanding dementia and its effect on patient and family; design methodologies; and how innovation on product design can intervene in dementia, creating a bridge between health care and design, the final product achievement, tests and the results obtained from that.

Keywords: dementia, interaction, product design, memory

Introduction

Dementia is a disease that affects a very significant number of people, having been diagnosed in 35.6 million (Prince and Jackson, 2009). It is a disease that causes various disorders, impoverishing quality of life as well as their carers and their families. Dementia manifests itself through different symptoms, one of which is short and long term memory loss, which leads to the loss of the patient's identity and, consequently, interfering in their relations with others.

During the development of this project, we studied how product design can intervene in dementia in a way that could minimize the effects of memory loss in patients. This project was done in collaboration with the nursing home of Santa Casa da Misericórdia in Gaia, allowing us direct contact with people with the disease and the opportunity to closely assess the patients needs and participation. Through the use of different methodologies interventions we evaluated which types of activities and products would uplift and elicit a better response from the patients. This process was essential to the concept generation and product development.

PlayMemo is a product developed with the purpose of stimulating and exercising the memory of people diagnosed with dementia in a playful context. The main goal of this product is memory stimulation and the improvement of interaction between people with dementia, their carers and their families .

Project Investigation

Through collaboration with the nursing home Almeida Costa in Gaia we had the opportunity to practice active research. The research made in this project goes through three main stages: Observation, Evaluation and Implementation.

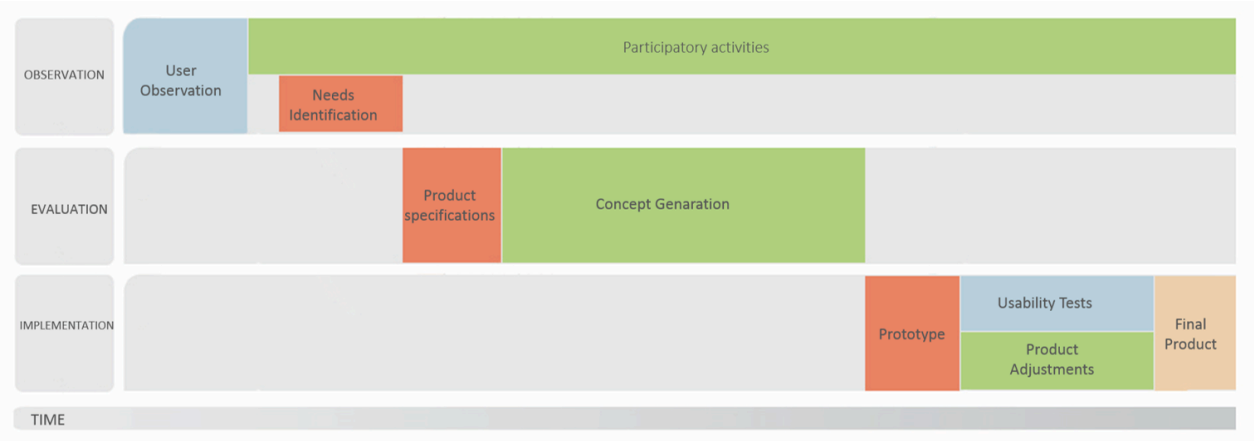

Figure 1: Methodology Approach Graphic.

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Observation

A user centred design approach consists in interacting with users from the beginning of the project (Gould & Lewis, 1985). Involving the user in all product development stages, knowing them and being able to identify their needs is fundamental to a successful outcome. This leads to a better understanding of user needs, translating them in product specifications (Mattelmäki, 2006). In this first stage the main objective was to understand dementia and how it affects people. In order to do that we used different methods such as observation and participatory activities in weekly sessions at the nursing home in Gaia.

Design has not contributed much to the people with cognitive difficulties, perhaps because it is difficult for the designer to relate to the user situation (Mattelmäki, 2006). There is a difficulty on the part of the designers to put themselves in the people's perspective (Pullin, 2009). For a better understanding of the symptoms of dementia and how people react to them in everyday life, an ethnographic research was made: patient's observation, focus group and photographic and film record at the nursing home Almeida Costa in Gaia. The researcher attended weekly sessions specifically for people suffering from dementia. On these sessions they constantly used different tools and activities in order to promote a healthy interaction between people. This direct contact with patients diagnosed with dementia allowed a thorough understanding of how different types of tools and activities can encourage the participation of the patients. Memory loss and a permanent state of confusion, was also observed in several patients.

In 2001, there were 24.2 million people living with dementia, with 4.6 million new cases per year. The forecast of the number of people diagnosed with dementia in 2080 is over 80 million (Prince and Jackson 2009). Dementia is a syndrome characterized by progressive deterioration of intellect, can affect memory, learning, language, orientation and understanding. Dementia is also a major cause of a person's disability at the end of life (Prince and Jackson, 2009). Memory loss is a symptom that manifests itself from the earliest stages of the disease, this is a symptom that worsens with the disease progression and increasingly interferes with the patient's personal life and their carers. The memory loss can lead to feelings of uncertainty, anger, frustration and fear. Providing support to memory loss has the potential not only to improve the quality of life but also to reduce the caregivers stress (Lee and Dey, 2007).

Evaluation

Through the Evaluation stage, two questions were raised: "What are the patient's needs?" and "How can the patient's needs be achieved?". Patients' needs became very clear during the first stage of observation: memory loss and difficulties engaging with other people. Those needs allowed us to define the goals of our product: stimulation of memory and logic capacity and the promotion of a healthy interaction between the users and others.

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In an attempt to answer the patient's needs we took different approaches. To stimulate memory we explored different possibilities, all of them focusing on sensory stimulation. To answer all of the established requirements we developed PlayMemo, a board game that intends to stimulate memory and communication. PlayMemo is a game that has as main purpose the stimulation of memories on daily routine tasks while promoting a good interaction between patients and others. The goal of this game is to involve the user to make a connection between a certain task and an object. A board and a set of thirty-two cards compose PlayMemo. The board has four zones marked with different colours, each zone contains a set of images corresponding to a different theme. Themes are divided into Daily activities, Personal Activities, Exterior Activities and Fruits. Each theme seeks to develop reasoning skills and memory stimulation. As for materials, we considered that cork would be a good choice for this product, due to its characteristics. It has a smooth texture and it is a light material, being perfect for the physical restrictions that some of the users present, also adding the fact that this material is highly recognizable to the user.

Implementation

Design should be fully involved in dementia, either through ethnographic studies, interviews or participatory methodologies (Cohene and Baecker, 2005). In this stage we focused on answering the question "How well are the patient's needs met?". We created a prototype and made different workshop tests with the users, which allowed us to adjust the product to the group.

Figure 2: PlayMemo Prototype.

The users should always have an active participation during product development (Sanders 2002). We conducted several tests in order to evaluate every aspect of the object and reformulate what would be necessary according to this group of users. In the first tests, we started by testing the images and the following tests we tested the final product shape.

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We realize all usability testing with the same group of people until the final proposal, having some new people added in some final tests. All focus group participants have been diagnosed with dementia. Additionally, we had two people who have been diagnosed with mild cognitive decline. This allowed us to compare the response to the product between people in different conditions, being able to see the potential of *PlayMemo* to be adapted to other situations. All of the tests were conducted with the help of two carers, Rita Reis and Liliana Ribeiro, both social educators and with the psychologist orientation.

Test 1

This first test considered two parameters: the formal aspect of the images and the response from the patients to them. For this test we had a group of eight people which was divided into two groups. Group A was constituted by Olga, Lídia and Lurdes and group B by Emília, Maurício and Alice.

Some images revealed to be very confused to some of the patients who could not identify what object was represented on the print. This first test revealed to be very helpful in understanding what kind of reaction they had to each picture and how could they make the association between them correctly. It was very interesting to see the dynamic of group A, who ended up doing the matches in group, generating a very positive interaction between the three patients, who were talking about different subjects that came up as they saw the different images. In this group some of the patients revealed difficulty in understanding some of the cards. Group B revealed a more solitaire approach. Mauricio became very enthusiastic about the activity, explaining his reasoning to make the matches and reporting two cards which he didn't understand. The other two patients were more passive, Alice refused to participate in the activity and although Emilia had shown interest, she needed constant support from the carer to complete the activity. After this test we eliminated some of the pairs of photographs which did not fit properly in the division of themes we had created. We also replaced some of the photographs, which were not perceptible by the patients.

Test 2

After replacing some photographs, we conducted a new test. We made two groups, the Group A was constituted by Emília, Lídia, Gerogina and Brandão and group B by Porcina, Maurício and Manuel.

In group A, the responses were very positive; every patient was able to match the cards. Still, Emilia required some stimulation from the caregiver but Lídia was able to make all of the matches by herself. Brandão and Georgina, were diagnosed with mild cognitive decline. Georgina showed great enthusiasm with the activity, always ask questions about it and giving her opinion. Brandão refused to do the activity. He says that he would not be capable of making the matches between

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the images. In group B, Porcina and Mauricio completed the activity very well. The new photograph representation proved to be most enlightening, not causing the confusion that the previous ones did.

Figure 3: workshop interaction

Test 3

In this test we introduced to the patients cards with drawings instead of photographs. The focus group was constituted by Lídia, Maurício, Manuel, Georgina, Emília, Alice and Fernanda. Our goal was to test if there was any difference between the comprehension of drawings and photography by the user.

We presented the cards to users, one by one, and asked each person to complete the matches. Every patient was able to achieve the task. At the end of the tests we observed no significant difference in comprehension level between drawings and photographs. However some users seemed to prefer photographs over drawings.

Figure 4: Testing workshop – Drawing testing.

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Test 4

This time, we tested the final prototype. From this test we expected to evaluate the interaction between users and the final product. The focus group was composed by Maurício, Manuel, Georgina, Emília, Alice and Fernanda.

We presented each patient with PlayMemo, explaining how the game worked. The users showed a lot of curiosity and interest. Lidia started to complete the matches, although dismissing the colour system. Manuel completed all of the matches by himself, becoming completely focused on the task presented to him, however he did not realized the colour system between the cards and the board. When alerted to it, Manuel immediately looked at the board and matched two sets of cards he had wrong before. Mauricio also completed the game by himself, using the colour system as a guide to place and make the matches. Emília demonstrated enthusiasm but could only complete a few matches. Georgina, completed the game, reassuring the carer that she really liked it because it made her practice memory stimulation spontaneously.

Figure 5: Testing workshop - Final prototype.

All patients interacted very well with the board. They were able to understand the orientation of the images, and quickly understood how the game should be played. We validated the colour system, which brings some benefits, although not to all users. They responded very well to the shape and material of the cards, although not everyone grabbed the card using both extremities as we intended to, but they shown no difficulty interacting with it. Using cork as the main material revealed to be ideal to this game. Since it is a very light material, it facilitated the transportation of the product. Also the cards were very light and allowed patients to lift them without any problem, enabling them to grab as they felt more comfortable.

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Conclusions

PlayMemo proved to be an object with great potential impact in people suffering from dementia in a very positive way. It was shown to enable memory stimulation and promote healthy interaction, while strengthening users' reasoning skills and deduction capabilities. Through the different tests, we could see that *PlayMemo* has the potential to be adapted to other situations. The carers, who helped us to conduct the tests, noticed right from the beginning, the impact of this proposed product was to the patients, stating that it was a stimulating activity not only for people with dementia but for others as well.

The user-centred approach and methodology was crucial to the project development. The Observation stage was fundamental to understand people suffering from dementia, giving us an insight of where design could intervene and help us set the project requirements to start the Ideation stage. The Implementation stage allowed us to make constant and necessary adjustments to the product to requirements and patient's needs. Doing participatory activities with users from the beginning of the research project revealed to be essential to the successful outcome of the final product. The participation and interaction, give us the opportunity to identify their needs, test the product and adjust what was necessary. At the end, we were able to create an accessible product to final users, providing a positive impact on their lives.

From the researcher perspective, emerging in a different reality revealed to be a challenging task but rewarding at the same time. Observing and interacting constantly with patients at the nursing home was fundamental to personal understanding of how dementia impacts one's life, contributing greatly to both perspectives – research and personal growth.

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References

COHENE, T., BAECKER, R. & MARZIALI, E. (2005) Designing interactive life story multimedia for a family affected by Alzheimer's disease: a case study. CHI'05 extended abstracts on Human factors in computing systems, 2005. ACM, 1300-1303.

Design Council (2012). Living Well with Dementia. London: Design Council.

GOLD, J. D. & LEWIS, C. (1985) Designing for usability: key principles and what designers think. Communications of the ACM, vol. 28, no.3, pp. 300-311.

LEE, M. L. & DEY, A. K. (2007) Providing good memory cues for people with episodic memory impairment. Proceedings of the 9th international ACM SIGACCESS conference on Computers and accessibility. ACM, 131-138

PRINCE, M. & JACKSON, J. (2009). *World Alzheimer Report 2009. London: Alzheimer's Disease International.*

PULLIN, G. (2009). Design Meets Disability, Cambridge, Massachusetts, The MIT Press.

SANDERS, ELIZABETH B., (2002). From User-Centered to Participatory Design Approaches. In J.Frascara (Ed.). Design and the Social Sciences. Taylor & Francis Books Limited, 2002.

TUULI, MATTELMAKI (2006). Design Probes, 2nd edition, Helsinki: University of Art and Design.

ISBN 978-1-84387-385-3