MOBILE LEARNING 4ALL

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ABSTRACT

We are in an innovation process for the development of a new generation of tools and resources for education and training throughout life, available in any platform, at anytime and place and in any language. The project TOPQX intends to congregate a set of theoretical and empirical resources that form a scientific base from which it will be possible to question and to suggest new answers, fitting the requirements and interests of the users of these resources. As an output of these efforts two multiplatform and multi device products will emerge: Vox4ALL® and ActiveBrain4ALL.

KEYWORDS

Augmentative and Alternative Communication (AAC); Mobile Learning; Symbol Systems; Active Aging; Brain Gym, Vox4ALL; ActiveBrain4ALL; Multiplatform.

1. RESEARCH CONTEXTUALIZATION

Having into account the diversity of the populations with which we intend to interact, project TOPQX does not have, from the methodological point of view, only one predefined strategy. To present an innovative solution, that benefits the target population, we need to know who they are. Facing the heterogeneity of the contexts and experiences of the involved populations, we foresee different research challenges and the use of different methodological resources.

When we identify more specific needs and problems that affect a defined population the case study can be one of the techniques to considerer. With the objective of systemize our research work in this project, we opt to following the strategy suggested by Yin (2005) for the Case Study. Considering, with Stake (2005) that the case can be a person, a program, or a set of programs, a group of professionals or another category that can be seen as an unit of analysis, we propose three sequential procedures: the definition of the case to study; the multiple option for an only case or cases; and the deepening of a problematic that bases the protocol for gathering the empirical information and the analysis guidelines of the collected data (Yin, 2005).

The research that we report here, although exploratory, had close followed this methodology. The retrieval, observation and comparative analysis of the different available applications and the retrieval of data within the groups for whom these applications are made were conditioned, in the research carried through in the subprojects Vox4ALL and ActiveBrain4ALL, by the two cases that we intended to explore. The first one appeared of the need to implement a system that served a population that presents sensorial, cognitive or motor disabilities, permanent or transitory, that compromises its communication capacities. The second one is a solution thought for the adult population at any time, in any place and any language, who needs to keep active the mental and social abilities.

In parallel, and with the objective to get quantitative data, the two studies had appealed to the technique of inquiry questionnaire. The collected data had allowed that the first specification resulting from the studies of benchmarking and the vision of the project team could be adjusted and collated with the opinion of a set of technician specialists.

Later on, a specialist's focus group will add a critical insight on the specification. The potentialities of this technique are multiple. The technique helps, at an initial moment of the research, the reshape of the questions, or even the emergence of new research questions, from a first empirical approach to the thematic. As Kruger and Casey say: "The purpose in the focus group is to listen and gather information. It is a way to better understand how people feel or think about an issue, product or service" (Kruger & Casey, 2000).

Moreover as Virginia Ferreira explains: “In the base of the option for this type of interview it is the certainty that it is possible to know the attitudes, the beliefs and the feelings of the people better, when they meet in group interaction, because the group situation favours the emergence of one bigger multiplicity of opinions and emotional processes, much more limited in the situation of individual interview” (Ferreira, 2004).

Finally, we consider that the triangulation of the different types of information, collected by diverse techniques, should be a preferred strategy in the research process of the TOPQX project. Only convoking various perspectives in this analysis, crossing data and procedures, we will be able to assume the accuracy and to strengthen the validity of our projects.

2. TWO DIFERENT PRODUCTS

We will present the innovation process of two multiplatform and multi device products from the initial idea to the first specification, through benchmarking analysis, online questionnaires and focus groups.

2.1 Vox4ALL

Communication is a complex and basic process for the development of the human relations. When communicating, the more used way of expression is to talk. To speak not only empower the human’s interactions, but also develop the cognitive skills and thought, allowing new and more elaborated learning. However, “a significant number of the population is unable to communicate through speech. These may be people totally unable to speak or cases in which speech is not enough to fill all the communicative functions” (Tetzchner & Martinsen, 2000). The causes can be innumerable, from the bad use and vocal abuse to hearing, cognitive, neurological, emotional and amnesic disorders, to cerebral injuries, cerebral paralyses or vascular accidents (Franco, Reis & Gil, 2003).

To override the necessity of communication, intrinsic to the human being, it is important to provide to these people, as early as possible, a System of Augmentative and Alternative Communication (AAC). Many times, a system of communication functions as a tool to fight to the already mentioned disorders, constituting “a set of techniques, aids, strategies and skills that a person without oral communication uses to replace or minimize their inability to communicate through speech” (Nunes da Ponte & Azevedo, 1998) and also, in some cases, to promote the speak competence.

Traditionally, these systems were available in paper, specialized voice recorder devices and computers.

The development of these systems is guided by the Augmentative and Alternative Communication (AAC) that appeared in the United States of America, in the eighties, resulting from a multidisciplinary work that recognizes the right to communicate to all the individuals without exception.

In recent years several solutions have appeared that override the communication gaps, as software like Communicate with Symbols. However, these systems do not answer efficiently to the mobility needs. As we know, the users of these systems need to communicate in different spaces, for example, at house, at school, at public services, hospitals, etc., so mobility is a must have.

On the other hand, innovations are not always immediately introduced by who can recommend them, causing sometimes devastating consequences, avoiding the success of learning a multimodal communication system (Beukelman, Fager, Ball, & Dietz 2007).

Imagina is developing an AAC system, capable to migrate between different mobile devices, conferring to disabled users the possibility of getting a normal life, granting to them the capacity to communicate in all the contexts and spaces. The Vox4All is a solution thought for tablets and smart phones based on communication grids, with the main aim of minimize communication problems and enhance communication competencies.

To create communications boards adapted to the communicative needs of the users we will use a pictographic system, the Widgit Symbols for Literacy, although the users can choose another one. This communication system allows people, of different ages, with communication difficulties, to interact with others, expressing their opinions, wishes, feelings and decisions.

In our first phase for creating the new system, it was carried out a benchmarking study, that allowed, among other things, to conclude that in Portugal it is not available any application developed under these

principles, combining portability with well established AAC systems. The same is not true in other countries, where we found several applications trying to overcome this need. From this analysis become evident a common set of functionalities to be included in a product that intends to cover a vast group of people with communication problems, definitive or temporary, independently of the degree of incapacity and age. These features are the possibility of using images, symbols and pictures, synthetic or recorded voices.

However, a truly new product must be planned to go beyond benchmarks of the industry. There are two fundamental aspects we will look into: The power to build communication interactive boards on the mobile devices and the usability of the application. The application should be simple, intuitive and inclusive so that can match all type of users. As the target group is very heterogeneous we need to provide different ways of accessing and using the software. Some people with severe communication impairments can use their hands; others cannot, for example, people with severe motor disabilities will have to use alternative ways, such us scanning systems and adjustable ways on how to click.

It was also carried out a survey using a questionnaire to rehabilitation professionals: speech therapists, special education teachers and psychologists, among others, that somehow deal closely with potential users of our communication system. The questionnaire aimed to understand what professionals hope to find in this kind of application and what they believe it is more important.

Moreover, the product is thought to benefit from the advantages of the new touch screens, combining easiness of use and agility, with enhanced user interaction. The specification of the product was founded on the benchmarking study, being complemented by the insights resulting from the data collected through the inquiry questionnaire.

2.2 ActiveBrain4ALL

Aging has been increasing; being one of the main reasons for this phenomenon the enlarged life expectancy. Not only in Portugal but also across Europe, there has been this trend: involution demographic fits into the mainstream of the population dynamics of developed countries and the world's population.

This fact provokes a new attention to a more active aging, with quality of life and autonomy in the elderly people. This debate relates to the fact that the increase in the average age of the population has resulted in a higher incidence of chronic degenerative diseases, with dementia being one that has more impact on the lives of seniors and their families. It is common knowledge that with the arrival of old age appears a greater slowness in cognitive processing. At the same time attention and concentration become more difficult and memory impairment get more frequent.

Senescence is revealed in neuropsychological changes, especially as cognitive deficits, changes in memory and speed of thought, expression of episodes of confusion, psychological disturbances and changes in activities of daily living, which may relate to depressive symptoms and dementia. This has a number of repercussions and represents a barrier to social inclusion of the elderly, leading to a greater concern with the improvement of active and healthy aging.

However, the concept of the elderly has also changed over the years. Currently seniors are increasingly present in different segments of society and therefore a new vision of aging is needed with emphasis on a matter of extreme significance, cognitive rehabilitation that focuses on cognitive function loss and aims to improve the patient's condition both within neuropsychological side and quality of life.

In order to counter the prevalence of these diseases, the OMS (2002), has addressed fruitfully active aging, describing it as the process of optimizing opportunities for health, participation and security.

This organization has set as determinants of active aging access to health and social services; the adoption of healthy lifestyles, active participation in physical activity, healthy eating and optimization strategies and compensation of cognitive functions. In fact there is also abundant literature that reveals that the practice of physical and mental activities reduces the risk of developing dementia (Karp, Paillard-Borg, Wang, Silverstein, & Winblad Fratiglioni, 2006).

Some authors showed that high levels of physical, mental and social activities reduce the risk of dementia and if two or three components are associated then risk reduction is even more pronounced (Karp, 2006). It is, therefore, a need for greater concern to understand what the needs of the elderly, mainly in cognitive aspects, in order to slow aging and related degenerative effects of diseases such as Alzheimer's and other dementias.

In fact, the drilling of memory is essential for the promotion of healthy aging. A major cause of depression in the elderly is caused by consciousness of the decline in cognitive abilities and concentration difficulties.

In recent years there have been several studies that promote and certify that the achievement of certain games can be a good strategy to maintain and regenerate the memory (Churchill, Galvez, Colcombe, Swain, Kramer & Greenough, 2002).

On the other side, some authors refer that there is a brain capacity of recovery from the neuropathological damage related to aging and that this capacity can be increased by encouraging a more efficient use of brain networks (Katzman, 1993 & Stern, 2002).

Just for not promoting passivity of the elderly today, and taking advantage of technological developments, Imagina wants to develop ActiveBrain4All, an online platform with cognitive games for brain gym promoting active aging and rehabilitation. This platform is intended to cover not only the elderly but also younger age groups who want to maintain their cognitive abilities and people who have some cognitive impairment or brain injury. The exercises intended to be planned will be directed and focused with the objective of stimulation and reorganization of cognitive areas in deficit through different games that work on various cognitive areas: memory, attention, language, reasoning, concentration, among others.

Before training, people will take a preliminary assessment for adjust the user profile, in order to understand their specific needs, what areas they are stronger and weaker, planning the intervention more efficiently. The purpose of this pre-test is to ensure that training is not applied indiscriminately, but according to the specificities of their needs. Besides the battery of games for training, the platform will have several tools to allow communication and social interaction with other users, family relatives, friends, neighbours and medical care staff.

Initially we performed a benchmarking study analyzing several platforms of this type. We found a set of common characteristics to all of them, which proved to be extremely important to consider from the first stages of our design process. But we pretend to go further taking advantage of the portability that technological evolution gives us (an essential component of this vision) to extend this platform from PCs to smart phones and tablets, encouraging greater involvement of the elderly in society, preserving health and promoting greater control over their own life.

In addition, we conducted a survey that allowed us, among other things, to assess the usefulness of such a platform and how we can maximize and adjust it to the real needs of the target population. The set of questions was directed to rehabilitation technicians, therapists and caregivers, among others.

3. ALL DEVICES, ALL OPERATING SYSTEMS - TECHNOLOGICAL CHALLENGES

On the last few years there was several improvements on technology creating smaller and easier devices for mobile work and mobile learning. 90’s brought smaller phones with more than basic functionalities: calculator, scheduler and basic games. In the end of 90’s market begun growing for business smart phones, leaded by Nokia and palm phones. In the last 5 years, with iPhone operative system, the iPad appears. It becomes a huge hit all over the world, with Android devices trying to catch up, with cheaper alternatives.

During 2012, just on the first two Quarters, almost outsold the total number of units sold on previous year. The gadget market, it’s growing fast, but without common compliance, making apps that can run in so different devices with different operating systems and versions it is a great challenge for mobile learning.

HTML is an old standard, but lack of functions for the modern systems needs. So all the web browsers begun to implement a new common standard for the new needs - HTML 5. Created on 2004, by Web Hypertext Application Technology Working Group (WHATWG), together with World Wide Web Consortium (W3C) it suffer a lot of improvements until today. This technology was known by the world at April 2010 after Steve Jobs issued a public letter titled "Thoughts on Flash". Last year, Adobe, has discontinued flash for mobile, and begins to create HTML 5 tools to replace flash technologies. Since then several companies adopted HTML 5 as a new standard. Microsoft implemented HTML 5 as the main technology on metro environment at windows 8; Adobe created the Edge suite for HTML 5; Facebook uses it, on the mobile version. The Financial Times swapped its mobile app for an HTML5 web-based app that is now more popular than the native app (Reuters).

In order to achieve that our applications will run and migrate between almost any kind of platform and device, we will use HTML 5 as the main programming language. Anyway we are aware that this may be not entirely possible and we are considering also other alternatives that can better deal with the different capabilities of different devices and operating systems. This is a big challenge that we only are pointing on this paper. Our main concern is to get out with applications that will run in any operating system and device and that can migrate between them in a transparent and consistent way for the user.

4. CONCLUSION

Most software enterprises are creating software that can work natively or using virtual environments (like JavaScript) in the main platforms. Imagina within TOPQX project is following this trend, creating software using both methods: native, using cocos2d-x(c++), and HTML 5, running in the browser device. The first method brings more solid experience to the user, the last one brings an unique experience in web environment. Both of them work on the main systems (windows, Mac, Linux, iOS, Android). Both Vox4ALL and ActiveBrain4ALL will be developed with these technologies in mind so they can run and migrate between almost any mobile gadgets.

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