SPAIN

2015 Statistics

- **Life expectancy: 81.5 years**
- **Population: 47.7 million**
- **GDP per capita: US$33,000 (2014 est.)**
- **Mobile penetration: 102.6%**

Sources: CIA World Factbook (https://www.cia.gov/library/publications/the-world-factbook); Mobile penetration data provided by Informa UK Limited and based on market intelligence.

Augmented Reality for e-labora: Mobile Apps for Workers with Intellectual Disabilities

Wireless Reach and Vodafone Spain Foundation collaborated on a new project called "Augmented Reality for e-labora," which provided customizable mobile applications for workers with intellectual disabilities. The tools and training helped them successfully perform their daily tasks, increased their autonomy and advanced their careers. Augmented Reality for e-labora applications included step-by-step training guides, multimedia tutoring materials and access to other work-related information.

Challenge

- According to the International Labour Union, "One out of every six people in the world – or 1 billion people – has a disability. Between 785 and 975 million of them are estimated to be of working age, but most do not work."[1]
- Many countries do not have the necessary mechanisms in place to respond to the needs of people with disabilities.
- The World Health Organization cites several studies reporting that people with mental health difficulties or intellectual impairments have the lowest employment rates, including one that found people with intellectual impairments were three to four times less likely to be employed than people without disabilities — and more likely to have more frequent and longer periods of unemployment.[2]

Solution

- Vodafone Spain Foundation designed three custom mobile applications using the Qualcomm® Vuforia™ augmented reality (AR) platform, a product of Qualcomm Connected Experiences, Inc., The AR applications overlay digital material onto physical environments and can be accessed anywhere from a Qualcomm-enabled mobile device with 3G connectivity, a camera, and GPS capabilities.
- These AR apps provided people with intellectual disabilities with interactive media including text, images, audio, video and 3D models that help increase their autonomy and integration in the work environment:
    - ° EasyUse offers participants an interactive instruction guide with easy-to-understand commands to operate equipment such as printers, phones, washing machines and more. Job coaches have the ability to update the AR apps with additional graphics or tips for the workers through a web-based editor.
    - ° Who Is Who provides a visual directory of employees with photos, names, and titles that is superimposed over the physical office space while using a tablet camera as a viewfinder. This application helps the user identify who is sitting at each work station and easily locate the person they may need to work with to get their job done.
    - ° Follow My Steps uses location-based AR technology, to deliver step-by-step directions enhanced with 3D graphics and audio to help people commute between their home and workplace.
- The AR solutions were designed to incorporate Information and Communication Technologies in training activities, creating an accessible environment that enhances each worker's sense of security, emotional stability, communication, self-determination and participation in an equal-opportunity environment.
- Technology-rich activities enhanced the existing e-labora project, which is supported by the Spanish government through the previous Avanza 2 Plan.[3]

SPAIN

Technology

» 3G mobile devices, including smartphones and tablets powered by Qualcomm Snapdragon™ processors, a product of Qualcomm Technologies, Inc., are used along with client applications.

» These devices were used as personal support tools, providing communication, scheduling functionalities, on-location tutoring via multimedia, and step-by-step training, among others.

» Vuforia AR software development kit.

Impact

» Job coaches working with people with intellectual disabilities received technical training and are now using the AR web-based editor to customize the application for each individual with intellectual disabilities. For example, a coach can personalize the Follow My Steps AR app for each worker by entering their home and work address. Similarly, the coach can customize the directory of employees in the Who is Who AR app to each worker's office environment.

» These AR applications on 3G-connected devices reduced the time a coach spends training each worker, thereby increasing the number of workers he or she can coach in a workday.

» Coaches noticed the AR apps helped workers with intellectual disabilities to better understand complex job assignments.

» The 45 pilot participants are gaining a new sense of ownership over their work due to the independence afforded with access to personalized AR apps.

» Participants say they felt an increased level of confidence when performing tasks since the mobile app provides them with step-by-step instructions enhanced with colorful visuals and audio that they can review as often as necessary.

» Workers with intellectual disabilities claimed that the apps offer an alternative way of learning the material, which is helpful to those who have had difficulty reading numerous pages on printed manuals.

» The mobile device's functionalities and the custom AR apps have animated graphics and are interactive, which provided the workers a level of comfort and satisfaction in knowing they are performing the task correctly on their own.

Project Stakeholders

» APROCOR Foundation works to improve the lives of people with intellectual disabilities and is helping plan, monitor and evaluate this project in Madrid. ANIDI in Murcia and FunDown in Andalusia are also participating in these efforts in their specific regions.

» Qualcomm Wireless Reach is the main project funder and provides project management support.

» Vodafone Spain Foundation is responsible for the development of services based on the new AR platform, which expands the existing e-labora project supported by the Spanish government through the Avanza 2 Plan. The Foundation works closely with Pocket Widget, a software developing company, on the technological development and provides onsite project implementation support.

[1] "Inclusion of Persons with Disabilities." International Labour Union. Web. 26 Jan 2012. <http://www.ilo.org/skills/areas/inclusion-of-persons-with-disabilities/lang--en/index.htm>.

[2] "World Report on Disability." World Health Organization and World Bank.

[3] Plan Avanza 2 (TSI-040500-2010-85).