# A virtual environment-based training system for the blind wheelchair user through use of 3D audio supported by EEG

Submission date 14/08/2017	<b>Recruitment status</b> No longer recruiting	<ul> <li>Prospectively registered</li> <li>Protocol</li> </ul>
<b>Registration date</b> 06/09/2017	<b>Overall study status</b> Completed	<ul> <li>Statistical analysis plan</li> <li>Results</li> </ul>
Last Edited 06/09/2017	<b>Condition category</b> Other	<ul><li>Individual participant data</li><li>Record updated in last year</li></ul>

#### Plain English summary of protocol

Background and study aims

People with physical and visual disability sometimes are not able to do tasks independently. Wheelchair users sometimes have difficulty moving around in their wheelchair, especially if they have visual problems. According to the Brazilian Association of Physical Medicine and Rehabilitation (2012), the use of wheelchairs for daily activities can be helpful for rehabilitation and the training is done using wheelchairs. These devices can be adapted using technology to improve the quality of life of the users. Virtual Reality can be used to create an artificial (fake) environment that can be helpful for training blind wheelchair users. The aim of this study is to see if virtual technology and EEG technology, applies to the training context of blind wheelchair users, has the potential to assist them in mobility and to evaluate the behavior of people when using the system.

Who can participate?

Adults aged 18 and older who are blind and use wheelchairs.

#### What does the study involve?

Participants are told about the study and provide consent. They then fill out a questionnaire in order to get information about the virtual reality system. Participant then use the system for around 30 and 60 minutes. They then complete another questionnaire about the use of the system and their behaviour in order to see if there are any improvements or errors that need to be addressed.

What are the possible benefits and risks of participating?

Participants may benefit from facilitating mobility and accessibility of people who have physical and visual disability through assisted technology. There are risks that participants may have their identity revealed without their authorization.

Where is the study run from? Associacao de Apoio a Crianca Deficiente (AACD) (Brazil) When is the study starting and how long is it expected to run for? May 2017 to August 2017

Who is funding the study? Universidade Federal de Uberlandia (Brazil)

Who is the main contact? Mr Everton Silva de Souza

# **Contact information**

**Type(s)** Scientific

**Contact name** Mr Everton Silva de Souza

#### **Contact details**

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# Additional identifiers

EudraCT/CTIS number

**IRAS number** 

ClinicalTrials.gov number

Secondary identifying numbers BrainChair2017

# Study information

#### Scientific Title

A virtual environment-based training system for the blind wheelchair user through use of 3D audio supported by EEG

#### Study objectives

The aim of this study is to investigate whether Virtual Reality and EEG technology, applied to the training context of blind wheelchair users, has the potential to assist them in mobility, and to evaluate the behavior of people when using the system.

#### Ethics approval required

Old ethics approval format

#### Ethics approval(s) University Federal of Uberlandia, 09/05/2017, ref: CAAE: 68117717.0.0000.5152

**Study design** Non-randomised study

**Primary study design** Interventional

Secondary study design

Non randomised study

**Study setting(s)** Community

**Study type(s)** Quality of life

#### Participant information sheet

Not available in web format, please use the contact details to request a patient information sheet

#### Health condition(s) or problem(s) studied

User BCI Emotiv Epoc with adapted wheelchair

#### Interventions

The proposed path for the research will be:

1. Presentation of the research proposal, clarification as to its importance, and the invitation to the individuals and the responsible ones so that the people are collaborators, in the first moment 2. Read and explain the Term of Free and Informed Consent, together with the collection of signatures of the responsible and the individuals, in the second meeting

3. Application of a questionnaire with the purpose of knowing the profile of individuals and collecting information relevant to the development of the system

4. Use of the system in the association. The user will the System Virtual Brain Chair between 30 and 60 minutes. The system is composed of wheelchair adapted and integrated with Emotiv Epoc and Virtual Environment for replicated the movements.

5. Application of the questionnaire after use of the system

6. Analysis of the evaluation of the results obtained. It is important to point out that the individual can detect possible errors or needs for improvement of the tool which will feed back the process of analysis and development of the tool.

#### Intervention Type

Other

#### Primary outcome measure

1. The patient satisfaction is measured using the experience of patient and doctors that participate in the sessions with questionnaires and feedback as well as validation of time for execution of movements, percentage of correct movements and the quality of experience control

2. The viability of project is measured by assessing the validity of movements using EEG and

Facial expressions, use of stereo sound for orientation and commands of movememnts, if the Virtual Environment support the doctors for validiting the movements and the immersion of blind users with Sound 3D

#### Secondary outcome measures

Sync between 3D interface, hardware and real movements with patients is assessed using the wheelchair adaopted integrated with Emotiv Epoch, trying to move the wheelchair with brainwaves (EEG), check if the movement is correct and examining the movements if they are oriented by sound and sync between Virtual Environment, Brainwaves and Wheelchair integration.

Overall study start date 01/05/2017

**Completion date** 13/08/2017

# Eligibility

**Key inclusion criteria** Blind wheelchair users aged over 18

**Participant type(s)** Patient

**Age group** Adult

**Lower age limit** 18 Years

**Sex** Male

**Target number of participants** 10

**Key exclusion criteria** Does not meet inclusion criteria

Date of first enrolment 20/06/2017

Date of final enrolment 01/07/2017

# Locations

**Countries of recruitment** Brazil **Study participating centre Associação de Apoio a Criança Deficiente (AACD)** Brazil 02037-001

### Sponsor information

**Organisation** Universidade Federal de Uberlândia

#### **Sponsor details**

Campus Santa Mônica Bloco 3N – Sala114 Av. João Naves de Ávila 2121 Uberlândia Brazil +55 (0)38408 100 3239-4707 copel@ufu.br

**Sponsor type** University/education

Website www.ufu.br

ROR https://ror.org/04x3wvr31

### Funder(s)

**Funder type** University/education

**Funder Name** Universidade Federal de Uberlândia

Alternative Name(s) Federal University of Uberlandia, UFU

**Funding Body Type** Government organisation Funding Body Subtype Local government

**Location** Brazil

### **Results and Publications**

#### Publication and dissemination plan

Planned publication in a high-impact peer reviewed journal.

#### Intention to publish date

13/08/2017

#### Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study will be stored in a publically available repository at www.ufu.br digital library for 10 years for free. The data will be anonymised based on legal restriction.

#### IPD sharing plan summary

Stored in repository