

3D PRINTED DEVICES FOR SOCIAL PURPOSES

DESCRIPTION OF THE TECHNOLOGY

The research group “Design in Engineering and Technological Development” (DIDET), of the Artefactos Laboratory of the University of Alicante, has designed and developed **three socially responsible devices of affordable cost thanks to the possibility of reproducing them by means of 3D printing.**

- **Backpack clamping device.** It consists of a single flexible and strong body with two folding flaps, one for mechanical pressure closing and the other for free opening (see Figure 1), and can be operated with one hand only. The aim is to prevent the backpack's laces from slipping off the shoulders of people with functional diversity and thus improve their autonomy and quality of life.
- **Flute for playing with one hand.** It consists of a main body and a mechanism that allows you to play it correctly with one hand or to adapt it to an external device, such as a microphone stand (see Figure 2). The aim is to prevent children with motor functional diversity from being excluded from schools during music lessons. Either because they are forced to change instruments because

they cannot play with both hands or because they are assigned other tasks.

- **Robotic hand exoskeleton.** It consists of a structure with sensors and a drive mechanism that adapts to the shape of the hand. Voluntary movement is achieved by reading myoelectric signals sent from another functional muscle (see Figure 3). The objective is to help those people who have little or no muscle tone, due to neurological disorders, chronic pathologies or any type of accident that has left the member without mobility.

These are devices obtained by means of 3D printers that solve the disadvantages of generic products manufactured in an industrial way. In this way, people with functional diversity can count on simple, light, resistant, economic, customizable devices manufactured in a short period of time.

MARKET APPLICATION SECTORS

They are aimed at the sector of assistive technologies and improvement of the quality of life of people and are especially useful for people with specific problems in areas such as health, education, work or mobility.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The main advantage is the **social impact** generated by these devices. They offer vital alternatives for certain groups with functional diversity. We must remember that these types of solutions are not sold through mainstream market channels, because they are incompatible with conventional manufacturing systems.

The main innovative aspects are the research focused on the user and the design optimized for 3D printing, which allow us to create personalized support products that reach the user at an accessible cost.

CURRENT STATE OF DEVELOPMENT

The three devices are the result of user-centered research, in which the Artefactos Laboratory has collaborated with different social groups. Together with them, the dimensions and performance of the different devices have been tested and adjusted.

INTELLECTUAL PROPERTY RIGHTS

These technologies are protected by utility model or patent:

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Device	Title	Application Number	Application Date
Backpack clamping device	Dispositivo de sujeción para mochila ligera obtenida por fabricación aditiva	U201931890	15/11/2019
Flute for playing with one hand	Flauta dulce soprano adaptada para tocar con una sola mano	U201932022	11/12/2019
Robotic hand exoskeleton	Exoesqueleto robótico flexible portátil socialmente responsable	P201931145	20/12/2019

COLLABORATION SOUGHT

From ArtefactosLAB, DIDET group is looking for companies or institutions interested in supporting the development of the devices or in designing and manufacturing new ones for social purposes.

RELATED IMAGES



Figure 2: Flute to play single-handedly



Figure 1: Without and with the clamping device



Figure 3: Robotic hand exoskeleton

CONTACT

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