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**TOPIC:**

Web Application for Teaching Sign Language, Basic and Advanced to children in the Second and Third Year of Basic Education of the Deaf Education Unit of the Provincial Government of Imbabura Module."

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# " Web Application for Teaching Sign Language, Basic and Advanced to children in the Second and Third Year of Basic Education of the Deaf Education Unit of the Provincial Government of Imbabura Module."

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**Summary.** *The reason project of this article is the creation of a web application called "Manitos Mágicas" teaching sign language to Ecuadorian children from the Second and Third Year Basic Education of the Deaf Education Unit of GPI (Provincial Government of Imbabura), which it is intended to support people with hearing disabilities, as well as those for various reasons are related to them; and also accomplish the mission of the "Técnica del Norte" University to demonstrate their social responsibility. The project consists of two modules and provides vocabulary, phrases and evaluations that support the learning process through the media; It was designed using OOADM methodology and several free tools for manipulating multimedia audio, video and images like Avidemux, Audacity and Gimp, Netbeans 7.2 as a development tool with JSF2.0 framework and integration with the database It has been used PostgreSQL*

### **Keywords.**

Sign Language, Education, Web Application.

### **1. Introducción**

The technology nowadays is part of Education, being of vital importance enhancing in education systems for people with disabilities, in order to support the teaching-learning process,

So that their integration in society and a better quality of life is achieved, as noted (Costa & Navas Castejón Martínez, 2013, p. 32) "Special education has ceased to be an education based on the idea of deficit and designed especially for the poor and disabled subject of school age, a comprehensive and inclusive education based on the notation of special educational necessity "

From this perspective, this project will set the target of developing a web application for Teaching Sign Language, that minimizes the lack of knowledge of this language visual-gestural that allows deaf people to communicate fully and develop their intellectual capacity; therefore It's intended to become a tool to support the teaching-learning process for the second and third year of Deaf Education Unit GPI. Importantly around 2234 Deaf exist in Imbabura according to the National Equality Council on Disabilities (CONADIS) (MSP, 2014), and in this Educational Unit, children and youth with hearing disabilities who require understanding and management of sign language are formed.

In Ecuador, there is very little teaching materials to facilitate the teaching of sign language, Although the rights of people with disabilities have been considered in the National Plan for Good Living 2014-2017, "Objective 2: Promote the equality, cohesion, inclusion and social and territorial equity, diversity;" (SENPLADES, 2013); so recently public private television offers news and official programs

translated into the Ecuadorian sign language; while in other places is completely unknown, which would reassert designated by (DHEX, 2010): deaf people often suffer abuse in health services, education, leisure, among others, by limiting their communication. This It should be added that Ecuadorian foundation DHex (DHEX, 2010) lack of adequate parents and teachers of deaf children orientation, makes focus on the difficulties and not on educational achievement to be achieved.

With this background and considering that the Education Unit of the GPI has a basic and inanimate documentation, which makes tedious learning, the web application will be useful, further integrating multimedia elements that arouse interest in children with special needs to achieve interaction with the teacher and the computer application, reaching developing skills quickly; in this sense Villarroel Sunday notes: "It uses new technologies to design a didactic around a topic of little interest among students. The new media, visual and sound, increases your attention and participation "(Villarroel, nd, p. 37).

The application called "Manitos Magicas" consists of learning units, each with their content and an extensive vocabulary and expressions presented through videos for easy learning.

## 2. Materials and Methods

Performing this project focuses on the design and development of educational software using multimedia elements such as video, image, sound and text, with reference to the strict principles of WCAG 2.0 standard.

### 2.1 Materials

The tools used are open source as shown in the following table.

Tool	Description
Gimp y Gimp-GAD	Editing and creating images. Free tool with GNU license.
Avidemux	Free video editing, supports multiple file types: AVI, DVD compatible MPEG, MP4 and ASF regardless of stage.
Audacity	Sound editing. Free cross-stage application, GPL license.
EdiLIM	Games Creating
Inkscape	Maps Creating
Netbeans 7.2.	Stage for developing web applications with support for jsp, jsf and integration with PostgreSQL
PostgresSQL	Manager database object-relational, distributed under BSD license. It uses a client / server model and multiprocess to ensure system stability.

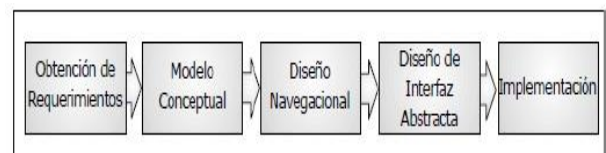
**Table1:** Tools for creating application  
**Fuente:** Autor

### 2.2 Methodology

The standard used for the design of the project was WCAG 2.0, Revilla Muñoz defines:

"WCAG 2.0 has the same spirit of trying to create an accessible web. Web accessibility is a right we all have to be autonomous in internet, that is, to be able to access content and functionality regardless of our functional diversity (sensory, motor, intellectual or mental) or the context of use (technological or environmental) conditions. "(Revilla Muñoz, 2013).

The methodology used was OOHDM, which guides the design of web applications with object orientation through a five-phase process. Figure 1

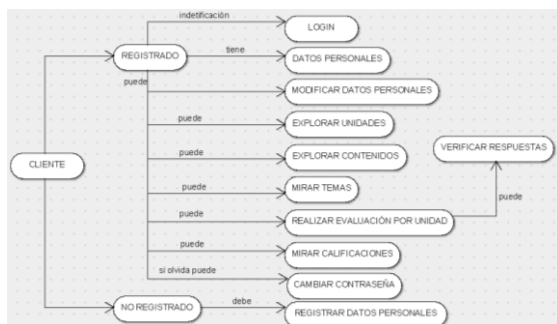


**Fig 1.** OOHDM Methodology stages.  
**Fuente:** Autor

## STAGE 1. OBTAINING REQUIREMENTS:

It is based on the use case charts, designed for scenarios to identify the requests and actions that the system must meet. Figure 2.

Fig 2. Diagrama de rol - Cliente



**STAGE 2. CONCEPTUAL MODEL:** In this stage the classes, relationships and cardinalities are generated

**STAGE 3. DESIGN NAVIGATIONAL:** Allows generating a topology navigation that allows to execute all tasks required by the user.

**STAGE 4. INTERFACE DESIGN ABSTRACT:** In this step the manner in which objects appear in the interface and which of them will activate navigation.

**STAGE 5. IMPLEMENTATION:** It involves the choice of language development, design tools and where they are going to store the data.

## 3. Results

The "Manitos Magicas" web application is a support tool, consists of two modules: basic and advanced module. The basic module has seven units: ABC, Food, Clothing (Clothing), Useful, Intelligence, Society, and Environment. Here are some pictures of your interface



Fig. 3. Main Menu Basic Module



Fig. 4. Display access to content



Fig. 5. Submission of topics

The advanced module has five units: Geography (countries, provinces of Ecuador, maps), math (addition, subtraction, multiplication,) vocabulary, Language and Communication (verbs, nouns, antonyms, synonyms, etc.) and natural sciences, further make sentences using those words, everyday phrases to start a conversation a seeker and games. Here are some pictures of its interface.



Fig. 6. Main Screen Advanced Module



Fig. 7. Display content



Fig. 8. Screen playful activities

## Conclusions.

- The limited amount of teaching materials for education to vulnerable groups such as people with hearing disabilities, this application makes an attractive alternative learning for deaf and persons connected with them.
- The use of free editing software multimedia objects, reduce any costs that

would involve creating a web application features of this project with excellent quality.

- The creation of a multimedia project following a specific methodology as used in this project OOHDM provides better analysis and design of the final product, to clearly define the conceptual, navigation and interface.

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## Bibliographies References

- Carrillo, R. A. (22 de 01 de 2013). *Herramienta Multimedia de apoyo a la Enseñanza de la Metodología RUP de Ingeniería del Software*, Edición electrónica gratuita. Obtenido de [www.eumed.net](http://www.eumed.net): [www.eumed.net/libros/2009c/587/](http://www.eumed.net/libros/2009c/587/)
- Catejón Costa, J. L., & Navas Martínez, L. (2013). Unas bases psicológicas de la Educación Especial. En J. L. Catejón Costa, & L. Navas Martínez, *Unas bases psicológicas de la Educación Especial 3a. ed.* (pág. 32). Esapaña: ECU.
- D.H.EX, F. (2010). *smart-track.info*. Recuperado el 02 de 12 de 2014, de [smart-track.info](http://smart-track.info/vivir-sordera/SorderaenelEcuadorHoy.aspx): <http://smart-track.info/vivir-sordera/SorderaenelEcuadorHoy.aspx>
- Escalona, M. (2001). *Metodologías para el desarrollo de sistemas de informacion global:Análisis comparativo y propuestas*. Universidad de Sevilla, Sevilla- España.
- Fernández, M. (2008). *Ampliación de Informática Gráfica*. Obtenido de Ampliación de Informática Gráfica: [http://informatica.uv.es/iiguia/AIG/web\\_teoría/tema5.pdf](http://informatica.uv.es/iiguia/AIG/web_teoría/tema5.pdf)
- Flores, F., & Morales, W. (2013). *www.academia.edu*. Recuperado el 10 de 12 de 2014, de [www.academia.edu](http://www.academia.edu): [https://www.academia.edu/7260500/Desarrollo\\_de\\_sitio\\_web\\_oohtm](https://www.academia.edu/7260500/Desarrollo_de_sitio_web_oohtm)

- Lapiente, M. J. (s.f.). *Hipertexto*. Recuperado el 4 de 12 de 2012, de Hipertexto: <http://www.hipertexto.info/documentos/oohdm.htm>
- MSP, M. d. (09 de 2014). *consejodiscapacidades*. Recuperado el 09 de 12 de 2014, de *consejodiscapacidades*: <http://www.consejodiscapacidades.gob.ec/>
- Quiñones, M., & Anti, I. (2010). *Free Software Foundation: http://gimp.org/es/*. Recuperado el 22 de 01 de 2013, de <http://gimp.org/es/>: <http://docs.gimp.org/es/>
- Revilla Muñoz, O. (2013). WCAG 2.0 de forma sencilla. En O. R. Muñoz, *WCAG 2.0 de forma sencilla* (pág. 19). Madrid: Itákora Press.
- Reyes Rebollo, M. M. (2008). *La función de los medios tecnológicos en los nuevos planes de estudios de magisterio*. *Píxel-Bit. Revista de Medios y Educación*, 33: 119-132, 2008. España: D - Píxel-Bit. *Revista de Medios y Educación*.
- ROSSI, G., URBIETA, M., DISTANTE, D., & GINZBURG, J. (s.f.). MODELING, DEPLOYING, AND CONTROLLING VOLATILE FUNCTIONALITIES IN WEB APPLICATIONS. *International Journal of Software Engineering & Knowledge Engineering*. Feb2012, Vol. 22 Issue 1, p129-155. 27p.
- Schwabe, D., & Rossi, G. (s.f.). The Object-oriented Hypermedia Design Model. *Communications of the ACM*. Aug1995, Vol. 38 Issue 8, p45-46. 2p.
- SENPLADES, S. N. (11 de 09 de 2013). *buenvivir.gob.ec*. Recuperado el 02 de 12 de 2014, de *buenvivir.gob.ec*: <http://www.buenvivir.gob.ec/herramientas>
- Vanegas, J., & Mejía, F. (jul-dic2012). LA COMUNICACIÓN DESDE LA LECTURA DEL LENGUAJE GESTUAL EN JÓVENES EN SITUACIÓN DE DISCAPACIDAD AUDITIVA. *Hacia la Promoción de la Salud Vol. 17 Issue 2,* p110-124. 15p.
- Villarroel, D. J. (sf). *Las nuevas tecnologías, Cuaderno de pedagogía*.

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