Interactive multimedia computer system and training aimed at training children in early education, using anaglyphs resources and 3D vision.

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Summary. *The main purpose of this research is part of the inclusion of ICTs[1] in education through a multimedia tool that illustrates the issues of early childhood education in an educational and entertaining, using resources Anaglyphs[2] and 3D Vision, same as it is designed for Educational Unit "Cahuasquí". The images of the anaglyph resources were created with PHOTOSHOP CS5 while the videos were made with FREE 3D VIDEO MAKER, which were previously captured in their respective angles (left - right). All resources became interactive multimedia thanks to FLASH CS5. For creating multimedia product DESED methodology which guides the development of educational software was used.*

Keywords

Vision 3D, anaglyphs, Methodology DESED, early education, Software Multimedia.

1. Introduction

The development of information of technology is advancing by leaps undoubtedly all aspects of life revolve around it that is why is necessary to apply to various fields, being initial education the subject of this investigation. In the last 20 years, this has not been very attractive and dynamic for learners: there are activities that capture more to the child than television, video games, movies and other, helping the academic development, turning so the best multimedia support in expressing and illustrate an event, or an event and in this case to impart knowledge.

The objective of this research is the use and application of stereoscopy better known as 3D vision, which gives the final product an added value due to handling three-dimensional interfaces using both anaglyph images and videos that serve to illustrate the student of early education on topics defined as abstract, integrated into an application of multiplatform; under the guidance of the DESED methodology, which considers aspects of Software Engineering, Education, Teaching and Graphic Design, among others. (Camarena, 2006). (Camarena, 2006)

Stereoscopy or also called binocular vision is responsible for collecting three-dimensional visual information and cause the illusion of depth in a photograph, film, or other two-dimensional image, which is created by presenting a slightly different image to each eye, as in our habitual way of seeing.

[1] **ICT:** Information and communications technology.

[2] **Anaglyphs:** Two - dimensional images that can cause a three - dimensional effect.

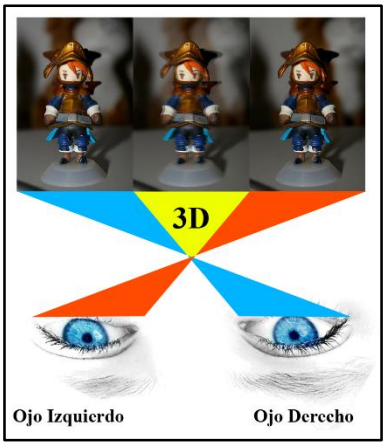


Figure 2: Crusade vision or binocular vision

Source: Own

The anaglyphs elements also featured in this research are images and videos that despite being two-dimensional, this provoke the illusion and effect of being in three dimensions, but as long as one look with filters in this case anaglyph glasses, which makes the information is sent by the multimedia resources to analyzed separately which means each eye respectively, and be rebuilt again by the brain making anaglyph 3D vision, considered a modern invention although since 1938 illustrations of this type were made. *(Herrero, 2013)*

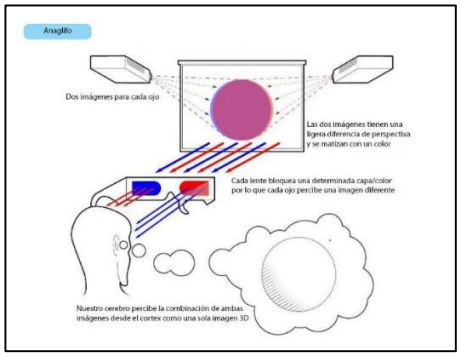


Figure 3: Interpretation of an anaglyph by human vision

Source:http://www.televisiondigital.es/Tecnologias/3D/PublishingImages/3D_anaglifo.jpg

2. Materials and Methods

2.1 Material

For the project development we use tools of image editing, with private and open source [3]to create anaglyph images code as well as Adobe Photoshop CS5 was used for its wide range of editing options, control levels Picture, Control channels, management layers and creating images from zero.

Figure 1: Window Adobe Photoshop.
Source: Adobe Systems Inc.

For the preparation of videos and anaglyph 3D conversion also required the use of Free 3D Video Maker: Conversion, Vegas 11: Editing; In addition we use the JClic[4] this tool is for building multimedia educational activities besides audio editors.

Through Adobe Flash CS5 docked and turned around the anaglyph interactive multimedia material, it becoming the main platform of the project. The combination of all these design tools allowed to create a new novel, friendly and innovative interactive software.

2.2 Methodology.

To prepare the project we used the DESED methodology , which focuses on determining the

[3] **Open Source:** It is the expression that is known to software freely distributed and developed.

[4] **JClick:** It is an environment for the creation, implementation and evaluation of multimedia educational activities, developed in the Java programming language.

needs for ES[5], analyzes and defines the subject, also defines the end user and choose the type of software that was being developed, and allows an assessment to the environment development.

The methodology will consists of 4 major stages therefore containing some steps in each, these stages are: Analysis, Design, Implementation, Testing-Launch Product.

The Analysis stage identifies and analyzes the following contents for application development

Referential features	
Tools for creating anaglyph resources	For creating anaglyph 3D images and videos.
Determination user	Children of first year of basic, between 4 and 5 years. Education Level: Beginning of academic life. Level of Intelligence: Suitable for everyone.
Process of Teaching and Learning	Teaching Methods. Learning theories. Stages of Learning process.
Study skills.	Activities that improve the level of understanding of the events that they need to learn.
Necessities	Implement the multimedia software needs 3D Anaglyph with materials according to available resources.

Table 1: Analysis stage
Source: Own

In the Design segment we define all the generalities of Software to obtained, as follows:

Preliminary designs and environments	
Choice of software.	It is part of Eduentretención category that integrates elements of education and entertainment, interactive by excellence because the variety of resources used.
User interface design.	Bright colors are used however noteworthy that the fact of using anaglyph glasses makes colors are altered significantly by the color filters that these possess, it means red and cyan.
Choice of developmental environment.	Various tools for the project preparation were used, the following mentioned above ADOBE Flash Professional CS5. ADOBE Illustrator CS5. ADOBE Photoshop CS5. SONY Vegas Pro 11. JClic Author.

Table 2: Preliminary designs and environments
Source: Own

At this stage the structure of the screens and configuration of the scene is also defined.

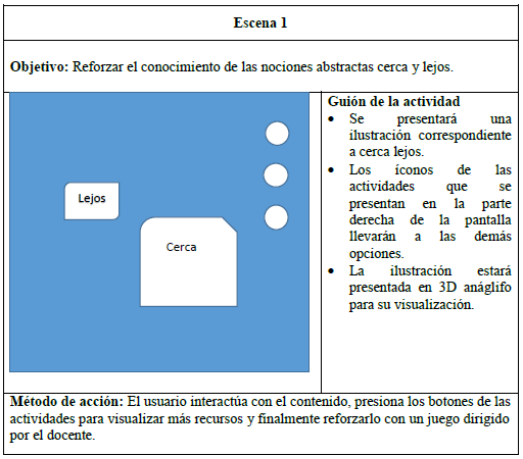
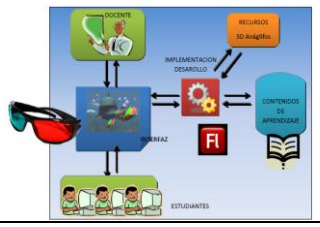


Figure 5: Format scenes
Fuente: Own

In the Implementation stage, we take into account product construction, features an overview and the most important of the research is the generation of multimedia resources anaglyph 3D.

Implementation	
Product Overview	

[5] **ES:** Educational Software.

Product Features.	Ease to use. With student and teacher profile. Interactive.
Construction of multimedia resources anaglyph.	Image capture from two slightly different viewpoints. Option 1:  Option 2: 

Table 3: Implementation
Source: Own

Building resources in 3D anaglyph several tests were performed with the two options shown in Table 4 to capture images and videos, the two options are feasible, however the second one provides a better outcome in exchange for increased costs.

The 3D camera having two objectives in its structure that the catch is made simultaneously to achieve the two slightly different images that is based not only anaglyph 3D; while capturing two cameras requires that they are of the same features and the shot must have a high degree of accuracy.

Process to create an anaglyph	
	
Left Image	Right Image

	
Level Red color for left Image.	Level Cyan color for Right Image
	
With the fusion of the two images preserving the difference between them, was achieved the 3D anaglyph image.	

Table 4: Process to create an anaglyph
Source: Own

To put in practice the software in children we observed an awesome affinity with the product, both guided by the teacher, as the activities for the student.

In terms of methodology DESED proved to be of great help to the research stages of development, taking into account that serves to build educational software.

The content created in the application shown in the following table:

Module	Initial Screen
Home	

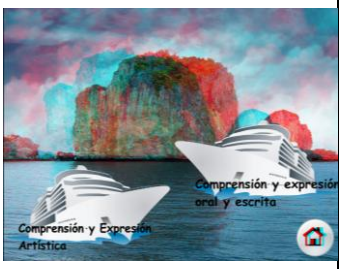
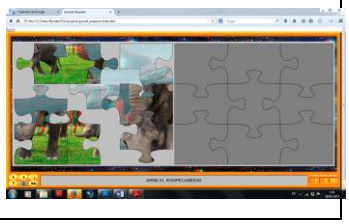
Logical-mathematical relationships.	
Verbal and nonverbal expression.	
Student Activities.	

Table 5: Content

Source: Own

3. Conclusions

The 3D anaglyph is one of the most economical marketing techniques and provides the viewer with an augmented reality almost 90%.

The 3D anaglyph generates a reduction in the intensity and color saturation due to Red and Cyan color that serve to create stereoscopy.

The use of a specialized camera for capturing images and videos is the best choice when it comes to capturing the material to design anaglyphs.

The ICT's in education are undoubtedly a tool that marks a before and after in the schools, and multimedia resources the best allies when presenting information.

The use of ADOBE Flash CS5 tool requires machines with stable performance, since the use of the same causes that consumption of hardware and software resources is high.

The use of JClic package for proper display is necessary to have an internet connection because in the execution complements the official site of JClic are downloaded.

Bibliographic References

Camarena, G. P. (1 de Junio de 2006). Repositorio digital IPN. Obtenido de Repositorio digital IPN: http://www.repositoriodigital.ipn.mx/bitstream/handle/123456789/5334/41-42-2.pdf?sequence=2

Herrero, J. (19 de Abril de 2013). Jesús Herrero, autor del libro "Madrid en 3D", nos habla de la estereoscopia. (xatakafoto.com, Entrevistador)

Adobe. (2011, Mayo 16). Adobe. Retrieved from Adobe: http://help.adobe.com/es_ES/flash/cs/using/flash_cs5_help.pdf

Cantos, F. L. (2012). Tecnología de los medios audiovisuales II. Madrid: Universitat Jaume I.

Cataluña, X. T. (2013, Febrero 20). Zona Clic. Retrieved from Zona Clic: http://clic.xtec.cat/es/jclic/

Educacion, D. d.-M. (2011, Agosto 01). Ministerio de Educacion Chile. Retrieved from Ministerio de Educacion Chile: http://www.mineduc.cl/usuarios/parvularia/File/2011/logico_matematicas2%281%29.pdf

Esquerdo, G. S. (2011). Diseño Visual y Expresión Gráfica. Barcelona: UOC.

Guzmán, J. Y. (2007). Las TIC y la Crisis de la Educación: algunas claves para su comprensión. Biblioteca Digital Virtual Educa.

Matellan, M. d. (2012). Guía para la integración del alumnado con TEA en Educación Primaria. España: Instituto Universitario de Integración en la Comunidad.

Ministerio de Educacion Ecuador. (2009). ACTUALIZACIÓN Y FORTALECIMIENTO CURRICULAR DE LA EDUCACIÓN BÁSICA. Quito: Ministerio de Educacion Ecuador.

Palau, T. M. (2011). Diseño de Interfaces Multimedia. Barcelona: Eureca Media, SL.

Pomeda, J. M. (2011). La televisión estereoscópica: ¿futuro perfecto o huida hacia adelante? Revista Comunicación y Hombre - Numero 7, 43 - 60.

Luz González Domínguez-Adame, L. R. (2005, Abril 24). Introduccion a JClic. Retrieved from Introduccion a JClic: http://www.juntadeandalucia.es/averroes/jclic/01_02_00.htm

Matellan, M. d. (2012). Guía para la integración del alumnado con TEA en Educación Primaria. España: Instituto Universitario de Integración en la Comunidad.

Ministerio de Educacion Ecuador. (2009). ACTUALIZACIÓN Y FORTALECIMIENTO CURRICULAR DE LA EDUCACIÓN BÁSICA. Quito: Ministerio de Educacion Ecuador.

Palau, T. M. (2011). Diseño de Interfaces Multimedia. Barcelona: Eureca Media, SL.

Pomeda, J. M. (2011). La televisión estereoscópica: ¿futuro perfecto o huida hacia adelante? Revista Comunicación y Hombre - Numero 7, 43 - 60.

Romero, L. (2009). La actividad lúdica como estrategia pedagógica en Educación. Revista Digital, 1-10.

Sanchez, J. F. (2005). Herramientas y metodos para la produccion multimedia. Barcelona.

Tutoweblog. (2013, Marzo 17). Tutoweblog. Retrieved from Tutoweblog: http://tutoweblog.wordpress.com/

XTEC. (2013, Noviembre 8). Zona Clic. Retrieved from Zona Clic: http://clic.xtec.cat/es/jclic/

Division General de Ministerio de Educacion. (2011, Agosto 01). Ministerio de Educacion Chile. Santiago: Edim Chile. Retrieved from Ministerio de Educacion Chile: http://www.mineduc.cl/usuarios/parvularia/File/2011/logico_matematicas2%281%29.pdf

Esquerdo, G. S. (2011). Diseño Visual y Expresión Gráfica. Barcelona: UOC.

Fundación Wikimedia, Inc. (2013, Junio 5). Wkiipedia, la enciclopedia libre. Retrieved from Wkiipedia, la enciclopedia libre: http://es.wikipedia.org/wiki/Adobe_Flash

Fundación Wikimedia, Inc. (2014, Junio 20). Wikipedia, la enciclopedia libre.

Retrieved from Wikipedia, la enciclopedia libre: http://es.wikipedia.org/wiki/JClic

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