Using ICT to teach sign language

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Abstract

In Spite of the fastest growing of Technologies of Information and Communication in the education and the development of very sophisticated environments to improve learning and education, there are a few tools dedicated to deaf education due to the difficulty to create content in sign language. In this context, we present in this paper an ICT environment we developed to aid deaf people improving their social integration and communication capabilities. Our environment is a specialized LCS that generates multimedia courses to teach and learn sign language [4]. These courses can be used either by deaf pupils to learn (or e-learn) sign language or also by hearing people to be able to communicate with deaf people. This educational environment uses mainly a web-based interpreter of sign language developed in our research laboratory and called Websign. It is a tool that permits to interpret automatically written texts in visual-gestured-spatial language using avatar technology.

1. Introduction

According to the World Federation of the Deaf (WFD), 80% of Deaf people lack education or are undereducated, are illiterate or semi-literate [7]. For this reason, deaf persons face difficulties when they want access to written information i.e. Web contents.

In this context, this paper presents a new tool for creating multimedia courses dedicated to deaf pupils. These courses may be useful for deaf pupils, for parents of deaf children and for any person who is in contact with deaf and need to learn sign language. Therefore, contribute in reducing the language barrier between deaf and hearing people.

This paper is organized as follow: the next section is devoted to present the difficulties of teaching deaf. In section 3, we describe our specialized LCS that generates courses for deaf person.

2. Difficulties in learning process

Teaching deaf pupil to read is a complex task, due to the phonological process in the procedure of reading skill acquisition. In fact the researches prove that phonological process takes a primordial part in the acquisition of reading skill [1]. Moreover, written languages contain a big number of phonetic markers which are essential to understand the means of sentences.

In 1979, Conrad confirmed that some deaf readers use an orthographic strategy as an alternative to the phonological. Although it appeared that this strategy is less effective than the phonological [2].

A study of the reading and writing skills acquisition done by Padden and Ramsey in 1998 on a large sample of deaf and hard-of-hearing children show that there is a moderate association between the finger-spelling comprehension and reading comprehension [5].

In this context we think that the use of ICT, in particular multimedia contents to teach deaf children, may constitute an interesting alternative which permits to exploit visual capacity in the learning process by the combination of texts, images, videos and animations in sign language on learning contents.

3. An LCS based on WebSign that generates courses to deaf persons.

WebSign [3] is a Web application based on the technology of avatar (animation in virtual world). It translates transcriptions of natural hearing languages to a real time animation in sign language. This interpretation is constructed thanks to a dictionary of word and signs. The creation of this dictionary can be
made in an incremental way by users who propose signs corresponding to words. A word and its corresponding sign interpretation are added effectively to the dictionary only after its verification by an expert administering the system.

Using WebSign, we have developed a web tool specialized in creating course for deaf pupils. The course is a group of lessons, in which every lesson is a set of web pages containing a variety of images and their correspondent descriptions. Our web tool provides an avatar which plays the sign already translated by WebSign.

It is proved that the use of graphics is an efficient pedagogical method to acquire new vocabulary items. In fact, this method is still used in traditional education in ordinary schools and in pedagogic games for young children.

The association of images and their descriptions offers the advantages of clarity and simplicity of acquiring information for both the lesson author and the pupil. The author generates the course, he can add delete and modify lessons. The pupil has the possibility to navigate in courses web pages created by the author (figure1).

3.1. User interfaces
Our tool offers two interfaces, one for the teacher and the other for the deaf pupil. The teacher’s interface is constituted mainly by a dedicated authoring tool to create, modify and delete lessons, edit links with different pages and visualize lessons. A lesson can integrate text, images and animations.

Animations consist of interpretation of text in Sign Language. Those animations are created by Websign and integrated in the lesson page in order to interpret automatically texts in visual-gestural-spatial language by the use of avatar technology. The student’s interface offers the possibility to the deaf pupil to consult the text and related images and to see the corresponding interpretation in Sign Language. In fact, every lesson generated by our tool is represented by a certain number of pages, in every page there are a limited number of images with their descriptions in full letter. When the pupil clicks on an image, the avatar, which is in the left of the page, plays the associated sign. This action can be repeated as many times as the user need to understand or to memorize the description.

3.2. Online and offline course
The pupil can use the tool by two different modes: the online mode and the offline mode. In the online mode, when the pupil clicks on the image, the web browser sends a request to Websign server, which sends him back the description of movement corresponding to the sign. The pupil can download the lessons and use it in an offline mode, which corresponds to web pages containing already the images, their description and the description of the movement corresponding to the sign. In such way no communication with Websign server is needed and by the way the pupil has no access to the update we can make on the Websign data base.

4. References