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APEINTA: a Spanish educational project aiming for inclusive education In and Out of the classroom

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ABSTRACT

APEINTA is a Spanish educational project founded by the Spanish Minister of Education and Sciences that aims for inclusive education for every student of all abilities in and out of the classroom. In this work, the APEINTA project is presented.

Categories and Subject Descriptors

K.3.2 [Computers and Education]: Computer science education; K.3.1 [Computer Uses in Education] Distance learning; I.3.6 K.4.2 [Computers and Society]: Social Issues - Assistive technologies for persons with disabilities; H.5.2 [Information Interfaces and Presentation]: User Interfaces – Voice I/O

General Terms

Human Factors, Design.

Keywords

Web accessibility, Universal design, e-learning, special needs, assistive technology, speech recognition, live captioning

1. INTRODUCTION

Nowadays, the use of new technology is growing in every field of education. Unfortunately, most of the educational systems using new technologies still present accessibility problems, discriminating who and how to study in and out of the classroom. We propose to use new computer science and electronic devices in order to avoid learning barriers that we can unfortunately find already in the educational environment.

2. APEINTA PROJECT

The APEINTA project is focused in two main inclusive proposals. The first proposal deals with eliminating hard of hearing students' communication barriers in the classroom for hearing impaired students: firstly providing real-time captioning (transcribing the teacher's speech with the help of an Automated Speech Recognition system –ASR-); and secondly allowing students with speaking problems typing in a keyboard questions or comments that lately will be converted to synthetic voice by means of a Text-To-Speech (TTS) system. The second proposal of this project is to provide an accessible Web learning platformⁱ with digital contents with a conformance level double-A according to the WCAG [1]

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It has been designed following inclusive design, with the focus on the user (student). The global architecture of the APEINTA project is presented in Figure 1.

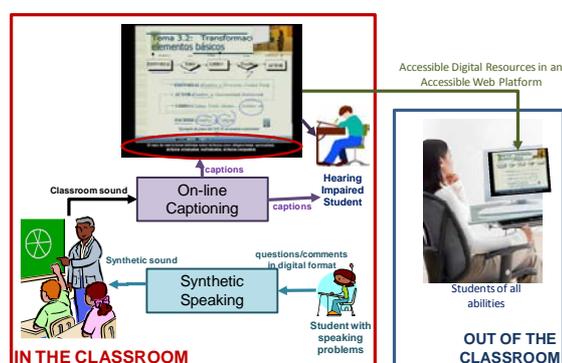


Figure 1. APEINTA architecture

3. RESULTS AND SOME CONCLUSIONS

The first prototype of the project being evaluated in the “Database Design” subject in 3rd course of Computer Science degree at Universidad Carlos III de Madrid (Spain). The Web platform includes digital resources related to the subject's topics and the real-time captioning and synthetic speaking is being evaluated during four months of duration of the subject.

Preliminary results obtained from interviews to a quality group of 10 students show that the students are really satisfied with the APEINTA project. Moreover, a quantitative evaluation of the quality of the real-time captioning show that the ASR system is not able to translate exactly the orator speech (sometimes because of the classroom noise or bad quality of the received sound, other times because of the software used for the ASR, and others). But the captions provided to the students present an average of 75.05% of correct words, 18.75% of incorrect words and a 7.20% of omitted words in a discourse of 1557 words, allowing the students to guess the final semantic of the teacher's speech.

4. REFERENCES

- [1] W3C, WAI, Web Content Accessibility Guidelines (WCAG) Overview, Editor: Shawn Lawton Henry, 2009
<http://www.w3.org/WAI/intro/wcag.php>

ⁱ Platform is available in the Spanish language at http://pid_basesdatos.uc3m.es/dadbd08/login.php (2009)