
A TECHNOLOGICAL CHALLENGE TOWARDS E-INCLUSION AND ACCESSIBILITY

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Abstract

The technology is considered a very important resource for educating and integrating citizens with deafness disability in modern working and professional society. In this poster the authors briefly describe the back ground and main objectives of the research project eFESTO funded by Leonardo Da Vinci Programme.

Introduction

In literature it was highlighted that citizens with deafness disability can get very advantages by using technologies both in educational and professional fields [1]. In recent years, in particular, it has been highlighted the important role of the Internet, as an instrument to create educational path that can be personalized and can go over the space-time constraints and to emphasize the role of the communication as central in the learning process. The online training can be considered *deaffriendly* [1] because it allows each deaf learner to follow a learning path that is based on his/her modality and time, allows share information and allows to facilitate the discussion.

During the design phase of the learning path for a deaf student it is not possible to consider and identify only one user category. Deaf learners are characterized in fact by a lot of different variables that derives both from their sensorial deficit but also from the relational and psychological sphere. In fact some fundamental factors are the psychological trends of the deaf learner and his susceptibility to interpersonal communication and most of all the degree of his deafness. Moreover in using some technological solutions specifically for deaf learners it is important to consider also the familiarity level of knowledge with the solution itself and also to consider the user inclination to interact with them. Another important aspect is the knowledge level of the language that depends most of all by the familiar context (for example if the parents have deafness disability).

The availability of technology today has affected education too, and it can prove to be particularly relevant to enhance the inclusion of Deaf and Hard of Hearing people by improving and/or devising new teaching modes and methods. In particular, the relevance of technology lies in its ability to:

- help to improve communication;
- help to reduce dependence on others;
- translate spoken words into visual cues.

The University of Sannio (Italy) is great experienced in education for deaf students and observed the described results participates to innovative projects and competences with specific regard to the methodological and ICT based dimensions of learning activities, tools and contents designed for deaf learners.

A case study : PSELDA– E-Learning Experimental Project for Deaf Students:

PSELDA is an Italian national experimental project created by the University of Sannio in 2003 - and funded by the Ministry of Education - with a specific mission: supporting and enhancing the university education of deaf students through the use of specific pedagogic models and methods tailored to the users' needs. Such pedagogical paradigm basically relied on visuality: that is, the use of images, animation and visual data boosting the message conveyed by the written code and further supported by ISL (International Sign Language), which allowed the learner to choose by herself/himself the linguistic code s/he found more suited, and, therefore, to be an independent learner. The curricula of the subjects scheduled for the 1st year students of IT at the Faculty of

Engineering of the University of Sannio were made available on a Learning Management System that contained the contents. The contents of each subject were then arranged into a list of activities and each activity was made highly interactive. The following is an example of what has been explained so far:

Università del Sannio
Livello 1

Introduzione teorica

Questo esercizio si colloca nell'ambito della rappresentazione dell'informazione in un computer ed in particolare della rappresentazione dei numeri.

Obiettivo
Si considera la rappresentazione dei numeri naturali, ed in particolare l'operazione aritmetica di sottrazione tra due numeri rappresentati in base due. Poiché in questo esercizio si considerano i numeri naturali e in generale la sottrazione può produrre come risultato un numero negativo, che non può essere rappresentato come numero naturale, si fa l'ipotesi che il risultato dell'operazione sia sempre un numero positivo.

Traccia
Esegui la sottrazione dei seguenti numeri naturali rappresentati in base due e verificarne il risultato:
 $1100_2 - 11_2$

Esercizio 15 - Traccia
Esegui la sottrazione dei seguenti numeri naturali rappresentati in base due e verificarne il risultato:
 $1100_2 - 11_2$

Possibili soluzioni

1001_2	1111_2	0001_2	1010_2
a)	b)	c)	d)

HELP ?

INDIETRO AVANTI CHIUDI

Figure 1 SPELDA : a sample activity structure

As it can be clearly seen, the screen was divided into four parts: the upper left section explained, through written text, the activity itself. The upper right section identified the reference name and the number of the activity, while the lower right section contained a visual link: the ISL translation

The interaction was provided a very high level due to the "drag and drop" method, or by the possibility of typing in the answer/solution or by choosing the right answer among those provided in a multiple choice activity. A further step then allowed the learned to check whether the answer given was right or wrong and an explanation of the reasoning leading to the correct solution was also provided. In a few words, PSELDA could give deaf students the best conditions for learning, because of the activities' "visibility", and of their visual and interactive features. The e-learning platform could actually create an illustrated, colorful, interactive, timely feedback learning environment for the hearing-impaired students of IT enrolled at the University of Sannio.

In particular, the PSELDA project allows deaf students of IT to:

- benefit from a continuous on-line formation (users can benefit by lectures and exercises any time and how many time they need);
- enjoy IT courses specifically thought for them;
- receive an effective help in their learning process, thanks to the help of multimedia technology;
- personalize their education through a one-to-one learning;
- benefit from didactic models of distant learning based on the creation of virtual classes, where teachers and students can still interact throughout the learning process though being far away;
- monitor the quality and quantity of their learning (tracking time spent on lectures, exercise activity and obtained results, etc.).

Exploring and devising new teaching methods, through the mediation and support of technology, can help make the exchange of information and communication easier for hearing-impaired students while they are studying, which seems to be one of the basic conditions for them to enjoy a higher education as their hearing peers.

The teaching methodology adopted in this project, was decided thanks to suggestions by expertise people of deaf student difficulties in learning processes, and in particular by collaboration of University of Sannio [3] with

the A.S.U.A association the integration of deaf students in the academic context) and ANIMU, an Italian association of interpreters of Italian sign language, and AIES (italian national associations for educator). Through the PSELDA system, the learning process takes place through a series of related didactical steps that can be of two kinds:

- lectures
- exercises

The topic of a lecture is presented to the user step by step, through descriptions closely related to the images illustrating the functions to be carried out. Lectures need to have a high “visual impact” to be easily understood and memorized. For this reason they strongly exploit multimedia objects of various nature (text, images, videos, animations, etc.). Exercises are presented to students also in a high interactive way: the user can autonomously, works to the exercise and try to give the correct answer. If s/he has doubts about the correct answer or has difficult to solve the exercise, s/he can exploit the help. To an immediate correct answer corresponds a positive score (which depends on the exercise complexity), to a correct answer given with the help corresponds a minor score, finally to a wrong answer corresponds a score of zero.

Towards professional training

During 2008 the European Commission has invited all the authorities and industries to promote the electrical competences and the digital learning that are fundamental most of all for those citizens who are in risk to be victim of digital divide and so to be excluded from modern e-society. In Europe in fact less than one in five disabled people is employed. For example in Italy, the observatory about the role of the ICT in the social inclusion of disabled people has noted that the disabled people employed in the SMEs are divided among 90% physical disabled, 6% deaf people and 4% blind citizens. Moreover the observatory has highlighted that these employers do not use ICT solutions during their working activities. The characteristic for low vocational activity of young people with disabilities, in most European Countries, is due various factors, among which are low levels of education and inadequate vocational qualifications. One of the main reasons of the inadequate vocational preparation of young people with disabilities is lack of early vocational orientation and appropriate profiling of vocational preparation. Schools often focus on teaching jobs and skills that are no longer required or marketable or are not appropriate. Considering this background about the employment of disabled citizens it is fundamental giving to disabled persons the opportunity to access to education services to acquire new marketable skills. To this end it is also fundamental that the disabled people can enhance the knowledge and competencies in communicating in foreign languages on the labor market going over his/her language disabilities and difficulties.

These are the main objectives of the eFESTO project found by Lifelong Learning Programme – Leonardo Da Vinci - Transfer of Innovation [7]. This project aims to realize an innovative learning environment for deaf learners for acquiring more skills about managing and using of electrical and electronic apparatus in different application fields, such as in biomedical, telecommunication, industry and sustainable environment. This aspect will give to disabled learners the possibility to acquire new competencies and so to have different chances to be employed in the modern e-society. The system will also deliver specific courses of English language for deaf learners, a very important competence in the labor market. The consortium is composed by University of Sannio (Italy), Dida Network s.r.l (Italy), Techin (Polan), Time-Foundation (Bulgaria), Istituto Canossiano Scuola Audiofonetica (Italy), Polish Association of the Deaf (Poland), Corvinno Technology Transfer Center Nonprofit (Hungary), Hungarian Deaf Sport Association (Hungary).

The eFESTO project is the merging of results, tools, competencies and evidences of two projects: PSELDA and LADIRE . The LADIRE project [3],[4], also funded by the Italian Ministry of Education and University in the National Programme (PON) 2000–2006. is a national measurement laboratory that operatively provides to the students of electric and electronic measurement courses the access to remote measurement laboratories and that delivers them different didactic activities related to measurement experiments to manage remote real instrumentations to learning to use them.

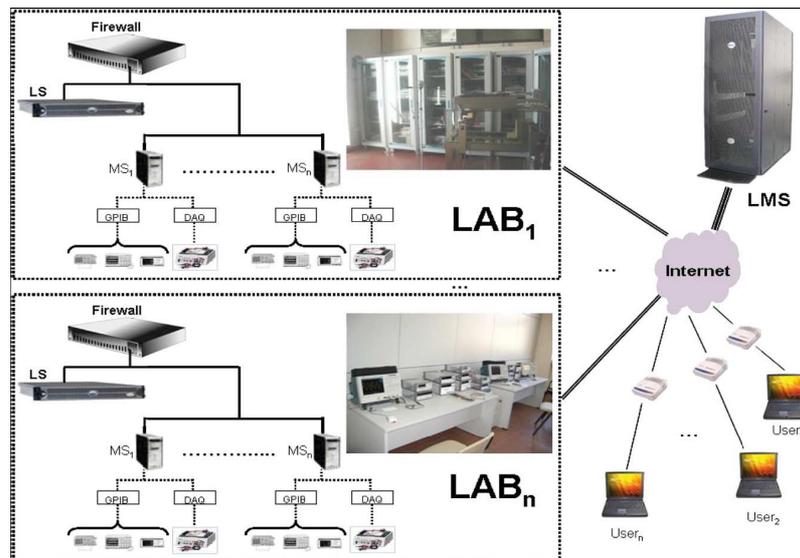


Figure 2 Architecture of LADIRE system

This project exploited all the potentiality of remote labs' activities for scientific disciplines and in particular the use of the Internet as a channel to reach the students or workers at their homes, was soon recognized [5],[6]. The LADIRE environment, in fact, is a distributed Italian national learning environment designed specifically for academic purposes. It has to be used by students to make measurement laboratory activities via the Internet using distance learning technology and methodology. It is based on the remote access and control of real instrumentation and apparatus.

References – Heading 4

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