

E-learning and disability: accessibility as a contribute to inclusion

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Abstract. E-learning can offer great opportunities to students with disabilities, but still few practitioners know exactly how to make it accessible. Although there are many technical standards and specifics to make e-learning platforms accessible, the pedagogical and didactic perspective of accessibility is not enough studied; disabled students can access to the e-learning platform but not to contents, resources, activities, collaboration and interaction tools. Starting from the basic assumption that an e-learning course is really inclusive when accessibility is addressed both technically and pedagogically, this research has the purpose to examine methods, tools and practices to propose a reference model for designing accessible e-learning courses in the higher education context.

Keywords: e-learning, accessibility, e-inclusion, special educational needs, higher education, disabled students, integration.

1 The general issues of the research

As reported by ISTAT, the national Italian statistic institute, in Italy there are 2,600,000 people with disability, equal to 4,8% of the population over 6 years old living in family. 11,407 students with disability in 2006-2007 attended degree courses in public universities, 137% more compared to 2000-2001. The number of Universities that provide online courses and degree programs has been growing dramatically. According to the European and national policies aiming to ensuring access to education for all, e-learning accessibility¹ is recognized as a priority addressed from the technological perspective through standards regarding the access to e-learning platforms, to web services and tools and to educational software [1]. Italian legislation establishes rules against discrimination in access and use of education technology, for instance Law 17/99 (technical and study aids and support

¹ Accessibility can be defined the degree to which a product, service or environment is accessible by as many as possible, including people with disabilities.

by a specialized tutorship for disabled students)², White Paper “Technologies for disabilities” [2] (technology must be designed taking into account disabled people and their special needs) and 2008 Ministerial Decree (educational software must be accessible by disabled students)³. Students with Special Educational Needs (SEN) can also use assistive technology to access to hardware and software, but this doesn’t guarantee the access to all learning activities. Thus, students with SEN can access to the e-learning platform but not to contents, resources and collaborative activities [3].

2 The research question

Several studies state the role of participation and interaction in learning activities to valorize equally all students. Since learning is a social activity and understanding is socially constructed, e-learning should be designed to promote participation, allowing all students to take part in all subjects and activities, enhancing cooperative learning, offering powerful opportunities [4], [5], [6], [7]. An effective learning can be achieved by breaking the isolation that disabled students feel in their life, through their integration into a virtual learning community; they have the right to participate to learning activities such as debates, problem solving, laboratory groups, reflective discussions, assigned questions, projects works, etc. [8], [9]. This means that technical accessibility in e-learning courses should be supported by a pedagogical accessibility (access to contents, resources, learning activities). The work hypothesis of the research is that e-learning courses not addressing a wide accessibility, both technological and pedagogical, limit or impede participation and interaction by students with SEN. The research aims to: define the significance of accessibility in an holistic way (technological and pedagogical); explore and describe the experience of students with SEN in e-learning academic courses; define the guidelines for a reference model to design accessible courses.

3 Significant problems in the field of the research

The research domain can be placed in the field of special education, in a multidisciplinary approach including other research fields: education technology, learning theories, e-learning models and approaches, e-inclusion, universal design, participatory design. At present approaches to accessibility are poorly supported by learning theory and are predominantly based upon learner-resources interaction and focused on providing staff with the technical skills to develop accessible resources rather than inclusive learning [10]. For a long time the problem of accessibility in e-

² Legge 17/99: Integrazione e modifica della Legge Quadro 5 febbraio 1992, n. 104, per l’assistenza, l’integrazione sociale e i diritti delle persone handicappate.

³ Ministero per le Riforme e le Innovazioni nella Pubblica Amministrazione, Ministero dell’Università e della Ricerca, Ministero della Pubblica Istruzione: Decreto Ministeriale 30 aprile 2008, Regole tecniche disciplinanti l’accessibilità agli strumenti didattici e formativi a favore degli alunni disabili.

learning has been handled exclusively from the technical side; during the last few years some authors have faced the e-accessibility topic from a new point of view, overstepping the mere technical accessibility to consider the learning process in all its dimensions. The most relevant contributors in this field have in common the user-centered approach, that means involving the students with SEN in the course design, according to participatory design approach [11], [12], [13], [14], [15]. In this perspective, e-learning courses should be designed to be usable and effective to all users, taking into account the principles of Universal Design, a new paradigm deriving from accessible design, barrier free and assistive technologies to produce buildings, products and environments [16], [17].

4 Current knowledge of the problem domain, existing solutions

The issue of accessible e-learning is treated by two different points of view: (A) technical accessibility (access to e-learning platform); (B) pedagogical accessibility.

(A) Many European documents stress the importance of the access for all to ICT and to e-learning courses and encourage the adoption of Web Accessibility Initiative (WAI) guidelines, technical standards recognized at international level that ensure a wide e-accessibility to disabled persons [18], [19], [20], [21], [22]. Other guidelines have been developed, many of which are more specific for education: for instance, the Chancellor's Office of California Community Colleges access guidelines and the Australian Vice Chancellor's Committee's guidelines. Global Learning Consortium (IMS) proposes technological standards to ensure inclusive e-learning quality experiences [15].

(B) Other researches and studies try to give an answer to the problem of accessible e-learning. Kelly, Phipps and Swift propose an approach that takes into account both technical and pedagogical accessibility. At the centre of the learning process there are the learner's needs, to be satisfied interacting between the different levels made by accessibility and usability, learning outcomes, infrastructure, local context [11]. Bel and Bradburn consider WAI guidelines useful for developers and webmasters, but lacking a pedagogic perspective. They propose a model based on the idea that accessibility is a primary component of every educational design, in every context, for every learner [10]. J. Seale proposes a "contextualized" model for e-learning in higher education, whose planning process involves all stakeholders: disabled students, lecturers, technologists, developers, managers, support staff. Accessibility must be considered a shared responsibility among all these stakeholders [13], [14], [15].

5 A framework for designing accessible e-learning courses: preliminary ideas

A systemic design of accessible e-learning courses should be the result of a participatory design, involving domain experts, pedagogists, technologists, disability experts, support workers, and the final users. Such a reference model should be flexible, adaptable to the different typologies of disability, learner centered, based on

individualized didactic; it should be the result of a participatory design, involving the students with SEN. The whole process can be resumed in a framework with 3 main steps: pre-design, pedagogical design and technological design.

In **pre-design** we refer to learning theories and paradigms to give a theoretical structure to the pedagogical model and to design the learning environment. We pay attention to: constraints (human/economic resources, implementation times, No. of users); aims and objectives; curricula and domain knowledge to develop. We outline the users, the disability typologies and their special educational needs. We can use International Classification of Functioning, Disability and Health (ICF), by the World Health Organization. Pre-design phase is accomplished by the needs analysis and the definition of learners' prerequisites [23]. **Pedagogical design** foresees the choice of didactic methods and strategies; the organization and implementation of didactic contents and resources, that must be planned according to accessibility criteria; the choice of communication and interaction tools; the scheduling and the organization of didactic support by teachers, tutors, special aid staff [24]. **Technological design** is the phase in which the virtual learning environment is designed and planned, by describing the communication architecture and the interface; technical standards for accessibility must be respected.

6 Research context and methodology

The research context is the School of Education (Facoltà di Scienze della formazione) of Roma Tre University, that since 2009-2010 delivers courses on a Moodle platform. In 1997 the University has instituted an Office for disabled students, delivering a support service for studying, attending lessons, using assistive technology, etc. There is also a tutorship service for the online courses: senior students offer guide and support to their peers in the online activities, but this service is not addressed to the students with SEN. The methodology is the qualitative interpretive research based on the constructivist paradigm [25], [26], [27]. The phases of inquiry includes: (1) *On desk inquiry*: literature survey, state of art and on desk data gathering about accessibility in university courses: experiences and good practices. (2) *Collection of empirical data*: description of the actual situation in the School of Education (support services, tutorship, technologies, student's needs). Procedures: (a) case study: how disabled students live their learning experience in technological online environments; (b) interviews with stakeholders: interviews with key actors and stakeholders (disabled students, practitioners, experts, learning technologists, lecturers) to discuss the topics of inclusion and integration in e-learning.

7 Elements of the innovation in the research

The research aims to explore the problem of e-learning accessibility and to develop recommendations for those involved in designing e-learning courses and for the support service for disabled students. In the international context, some authors are

beginning to concern with e-learning accessibility; they prove that there is a lack of knowledge of specific accessibility tools, methods and approaches in a pedagogic and didactic perspective. The previous cited studies and research on this topic propose general frameworks and models but don't explain how learning activities should be designed and planned. At national level there aren't yet researches and studies about the design of accessible e-learning taking into account both technological and pedagogical dimensions; courses aren't customized on the needs of disabled students, and there is no awareness of user-centered approaches such as participatory design and Universal Design. Moreover, e-learning in Italian university is a relatively recent issue: there aren't guidelines to design an accessible course that guarantees equal learning opportunities for all. At present, the e-tutors working in the online courses haven't the necessary competencies about accessibility and about special needs, so they can't efficiently support disabled students in the access to the environment and to the learning activities. This research wants to contribute to the accessibility debate affording the problem in all its educative dimensions, integrating the existing technical rules and guidelines with a new point of view focused on the access to all the learning activities that take place in the virtual environment.

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