

## Documenting the eAccessibility of educational software: supporting informed choices for a more inclusive classroom

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This paper deals with the problem of providing and disseminating information about the accessibility features of educational software products. Its ultimate aim is to support educational actors in choosing tools that facilitate the inclusion of pupils with disabilities into everyday classroom activities. It focuses both on the type of information to be conveyed and on the way to do so, and, more precisely, it seeks to answer the question: "In the field of educational software what kind of information about accessibility features is actually needed by potential users and how should it be delivered"?

**Keywords** eAccessibility; Educational software; Universal Access; eInclusion.

### 1 Education, Inclusion and ICT tools accessibility

*"The information society is rapidly becoming an essential part of economic, educational and social life [...]. Therefore, access of people with disabilities to information-society based products and services is a major issue in enabling and facilitating their integration in society"*[1]. There is a growing awareness that students with disabilities have the right to expect the same standard of education as their school-mates; this entails them having the right to access and use mainstream educational tools, including those ICT based.

Inclusion is seen as a process of addressing and responding to the diversity of needs of all learners through increasing participation in learning, cultures and communities, and reducing exclusion within and from education. It involves changes and modifications in content, approaches, structures and strategies, with a common vision which covers all children and a conviction that it is the responsibility of the regular system to educate all children.

According to Becta recent report in this area [2], the provision of technology alone will never fully capitalise on the opportunity ICT offers [to inclusion] without the understanding and skill of teachers in planning its implementation: *"there is a need for a clear understanding of the pedagogy of ICT and inclusive education by all those supporting children's welfare and education and those working in lifelong learning, at all levels. All initiatives seeking to extend the use of ICT in education now recognise that the teacher needs to be competent and confident in the use of technology, that the technology needs to be robust and sufficiently powerful to do the job, and that high-quality content should be available"*.

Inclusion, in its broadest sense, deals also with ensuring the production of high-quality educational content accessible for a wide range of learning needs; thus such contents could be used in different learning environments and could effectively support inclusive practices. This will help teachers to support all learners in fully exploiting their educational potential. In this view, schools systems, as well as individual teachers, are necessarily interested in acquiring and using "accessible" educational materials meeting the needs of all students.

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## 2. Educational software and accessibility issues

Interactive learning experiences are especially enriching for students who may otherwise have more limited experiences, due to physical sensorial or cognitive impairments. Nevertheless, educational software can be challenging for students with disabilities, and the possibility to fill in some of existing gaps can be guaranteed only if fully accessible educational products are used.

According to Serra & Muzio [3], there are two types of tasks when using a computer: functional and operational. Functional tasks are the ones related to learning and content. Operational tasks are those related to interfacing with the machine. It is important to make the operational tasks as transparent as possible in order that users can focus their attentions on the functional aspects – especially in a learning environment. To take an example, Figure 1 shows a screenshot of a well known multimedia educational software for foreign language learning that proposes a range of different activities and which can present a number of accessibility problems to students with disabilities:

- explanations, instructions and feedback are given only in audio, by the gold owl. Since comprehending this "interaction language" is an integral part of the learning experience, a student with a hearing impairment faces particular barriers in using this software because he may not access the information needed to complete the task;
- selections made by the user, with regard to contrast or colour levels and other display attributes, are completely overlapped by the application. Since the software doesn't allow fonts to be adjusted and doesn't provide clear contrast for objects that users must locate and manipulate, student with partial sight may have problems to interact with this software not designed to provide the flexibility they need (such as larger fonts and icons, and high contrast backgrounds);
- the interface only allows interaction via mouse: there is no possibility of access through keyboard or alternative input devices other than mouse emulators; thus a child who uses an assistive technology device can be stalled by operations that necessarily require mouse use.



**Fig 1.** Screenshot of the educational software "Kids World Bank 1" by Oxford University Press

This lack of full accessibility prevents students with disabilities from using the same materials as their peers and limits their educational opportunities. This means also that educational software industry now needs to consider the issue very carefully [4], and to follow those accessibility requirements established at international level. On the other hand, it is important that educational software databases and catalogues provide suitable information about the accessibility features of the products they list. Only when users of these information services (teachers, parents, students, etc.) have access to specific documentation they can gain understanding about the accessibility level of each product. In this way, they could be able to make an informed decision about the product to be used. Important questions such as "How can the accessibility of educational software be evaluated"? and "What are the main requirements to be met for a product to be considered "accessible"?" are discussed elsewhere [5]. It appears relevant to put forward here the issue of how specific documentation and information system should provide appropriate information about the accessibility features of educational software products in order to facilitate teachers in choosing powerful tools enabling inclusive practices.

### 3. ESSEDIQUADRO: informing users about accessibility features of educational software

In the following, ideas and observations about informing users on accessibility features of educational software are proposed coming from the experience carried out in the framework of Essediquadro, Italy's leading online catalogue of educational software (<http://sd2.itd.cnr.it>). Focusing both on the type of information to be conveyed and on the way to do so, the structured accessibility schema adopted in Essediquadro is proposed as an example of a possible way of providing full and effective information about the accessibility features of educational software.

#### 3.1 What is Essediquadro?

Essediquadro is an online service providing comprehensive, up-to-date information on over 4,000 products from both Italy and abroad. Run by the Institute for Educational Technology (ITD) under the auspices of Italy's Ministry of Education, University and Research Essediquadro is designed to meet the needs of the Italian-speaking education community (most users are primary and secondary school teachers). At the heart of Essediquadro is a searchable catalogue listing educational software for all school levels and disciplines, with particular attention to special education needs; a specific section is devoted to open source products. The service also offers support and guidance for integrating software and multimedia into the teaching / learning process: subject area software surveys, classroom reports, and more. The sheet of each product comprises a number of pages with different contents: general information about the product (author, cost, availability etc.), educational information (subject area, topic, target users, educational strategy, pre-requisites etc.), summary of contents. The product system requirements are also listed and few screenshots are available so that user may get an idea of the software interface. The further page called "Insights" offers information about software including teaching multiuse, subject areas avails, classroom reports and study topics. Finally, the page called "Accessibility" provides a critical look at software accessibility features, as outlined in the following paragraphs. It is important to highlight that a holistic view of the educational software, encompassing both the commercial and open source products, must be taken especially when considering the adoption of an inclusive approach.

#### 3.2 The structured accessibility schema adopted in Essediquadro

Essediquadro provides information about accessibility features of software products from two different but complementary perspectives: that of the regulatory legislation in force [5] and that of the specific, special needs of students. Mainly devoted to provide users (teachers, parents, students) with clear and appropriate information about accessibility issues of each product, the structured accessibility schema adopted in Essediquadro (in Fig. 2) is organized in four sections: *suppliers/author's self-declaration*; *compliance with regulation in force*; *accessibility and type of disability*; *usability access test*.

a)

b)

Fig. 2 Software Accessibility schema adopted in Essediquadro.

**Supplier/author's accessibility self-declaration.** According to the Riga Ministerial Declaration on eInclusion adopted formally on June 11, 2006, and the related document of the European Information and Communication Technologies Association, EICTA, author and/or software supplier should clearly state whether or not a software product is built following accessibility standards. The EU Ministerial Declaration on eInclusion which will provide political guidance for future action, states as a crucial element: *"Fostering the application of common requirements and standards, European or global, for accessible and usable ICT hardware, software and services, to be supported by appropriate user involvement, and means of demonstrating conformance, e.g. labelling"* [6]. In response to such a Ministerial Declaration, EICTA, has published a "European Industry Declaration" dealing with the important issue of a fully inclusive Information Society. In this recent document, EICTA supports self-declaration as the means of confirming conformance to accessibility guidelines and requirements; self-declaration, using a Supplier's Declaration, has been shown to encourage conformance while not stifling innovation. Self-declaration is believed to be fundamental since: *"EICTA believes certification and accessibility labelling are not reasonable, have few advantages, and limits innovation as vendors concentrate on acquiring certifications as opposed to creating solutions. In light of this, care should be taken when considering new legal provisions at the EU or national level"*[7]. Nowadays few multimedia educational developers provide such sort of documentation (excluding those products specifically designed for disable people) and when available, it ranges through a variety of formats and details. In order to facilitate users in understanding information related with this issue, adopting an appropriate and, where possible, EU-wide recognised format of *supplier/author's self-declaration* could, on one hand, ensure that relevant information are provided and, on the other hand, better support users' informed choice.

**Compliance with accessibility regulation in force (Law 4/2004. Annex D – DM July 2005).** In Italy, the accessibility of ICT tools is regulated by the recently passed Law n. 4/2004 (also known as "The Stanca Act")[4]. Eleven requirements for non web-based software applications are indicated, following the main requirements outlined in Section 508 of the Rehabilitation Act of the US Federal Government. Data presented in this section results from an analysis process aimed at testing the compliance of educational software product with the eleven accessibility requirements of the Stanca Act. Such analysis is carried out by expert evaluators using a methodology and tools designed and implemented by ITD/CNR. In Figure 2, green/red colours show to the users whether or not the software product is compliant with legal requirements. Further details are also available to users for better understanding evaluation results and their relation with specific type of disability.

**Accessibility and type of disability.** Assessing and documenting the compliance of each product with the regulation in force, is, of course, important but it is not enough to give an effective answer to potential users of Essediquadro service: what educators actually need is to be informed whether (and to what extent) a given software product could meet the needs of their classrooms (e.g. if a specific product can also be used by a blind or deaf student). In this perspective, an effective information system should underline direct links between legal requirements and type of disability, and should also provide users with practical clues on how to use the products with students, taking into account their different abilities. Thus, data presented in this section draw on the correspondence between each Law requirement and specific type of disability (in Fig.2). The concept of 'accessibility level' incorporates the frequency and the impact of accessibility problems in the whole product. In Figure 2, the 'accessibility level' is evidenced by the number of green-coloured squares (score); Table 1 shows the correspondence between "accessibility level" and the number of green circles.

**Table 1** Accessibility and type of disability.

Score	Accessibility level	
0	Null	Basically inaccessible application
1	Low	Low accessibility application, presenting relevant functional limitations
2	Incomplete	Partially accessible Application, presenting limited functionalities
3	Good	Well accessible application; basic functionalities available for all users
4	Full	Fully accessible application compliant with law requirements

Is full accessibility a myth? There is a concrete hope and feeling that it is not, but, at the same time, we must be aware that not all products can be completely accessible. As an example, one of the basic accessibility principles entails the labelling of all software audio elements. However, educational products aimed at teaching foreign languages that present unlabelled dialogues should not be rejected out of hand as they can be used by all disabled students other than the hearing impaired. It is evident that, from a strictly educational perspective, the listening comprehension is fundamentally based on audio presentations but it also requires that such audio presentation are not backed with written labels, which may change the activity focus [5]. Thus, accessibility evaluations of educational products, in the case of lack of perfect compliance with the accessibility requirements should clearly indicate 'for whom' (type of disability) each product is not fully accessible and if the lack of accessibility is due to a conflict between legal requirements and software educational goals. Within the Essediquadro Accessibility Schema, the grey-coloured circles (in Fig 2, part b) alert users that the evaluation of such product's accessibility features is not meaningful for that type of disability because of the mentioned conflict between legal requirements and software educational goals [CO]. It is important to consider the intended learning goals of each activities even in order to pick the most appropriate adaptation otherwise modification in compliance with accessibility requirements would result in a loss of educational value for most students.

**Usability access test.** Designed and carried out by the Italian network of clinical centres specialised in the field of technological aids (GLIC), data presented under this section mainly combine usability issues with accessibility criteria. GLIC observations mainly aim to make sure that specific devices can be used when accessing educational software. The section reports, therefore, on actual uses of students with disabilities monitored at the centres. The guidelines provided by GLIC offer detailed information about the accessibility of each educational product, as it was tested using various, different input and output devices.

### 3. Conclusions

The structured accessibility schema adopted in Essediquadro has been proposed as an example of a possible way of providing full and effective information about the accessibility features of educational software. The four sections of the schema give different responses to different user questions: *Is the product labelled as accessible by the author/supplier, thus showing that it has been designed and implemented following Universal Access criteria and requirements? Is the product compliant with the requirements of the regulation in force? For which types of disability can the product be considered accessible and to what extent? Is the product tailored to specific needs? What kind of specific input and output devices are allowed?* Documentation and information systems should guarantee the availability of all this information and the possibility to retrieve it in an easy way. Advanced search features should allow users, following transversal paths, to gain a better global understanding of accessibility issues, thus allowing them to choose accessible tools facilitating inclusive practice.

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