Monograph - 20 Years of CEPIS: Informatics in Europe today and tomorrow (published jointly with Novática*)

Guest Editors: Robert McLaughlin, Fiona Fanning, and Nello Scarabottolo

Presentation: Introducing CEPIS — Robert McLaughlin, Fiona Fanning, and Nello Scarabottolo

A Profession for IT? — Declan Brady

The European ICT Industry: Overcoming the Crisis and Helping Others along the Way — Hara Klasina

Legal and Security Issues in Informatics — Kai Rannenberg, Marko Hölbl, Eleni Kosta, Les Fraser, and Joop Verbeek

Informatics for All - Everywhere, Any Time — Peter Federer, Gerald Futschek, and Jorg Rueegg

Challenges for IT Professionalisation — Interview with Michiel van der Voort

The State of Informatics in Portugal — José Cardoso de Matos

Spain: The Situation of Informatics in 2009 — Fernando Pera-Gómez

Current State of Informatics in Central, Eastern and Southern Europe: The IT STAR Experience — Plamen Nedkov (with contributions from Balint Domolki, Giulio Occhini, and Niko Schlamberger)

GRADE: The Unofficial Story of a Successful CEPIS Undertaking — Rafael Fernández Calvo

1991: Making the Knowledge Work — Francisco López-Crespo

1992-1993: No Task Will Be Avoided merely because it is Impossible! — Maurice S. Elzas.


1995-1997: ECDL Take-off Years — Giulio Occhini


1999-2001: Unity in Diversity — Peter Morrogh


2004-2005: Moving to the Heart of the EU — Jouko Ruissalo

2005-2007: Building on our Collective Strengths — Geoffrey McMullen

CEPIS — Remaining Relevant for the Next 20 Years — Vasile Baltac

CEPIS NEWS

Maximising the Impact of ICT Infrastructure Investment — ECDL Foundation
The Social and Cognitive Dimensions of Computer-Supported Cooperative Learning

Andriani Piki

© 2008 Pliroforiki

This paper was first published, in English, by Pliroforiki (issue no. 18, September 2008, pp. 18-21). Pliroforiki, ("Informatics" in Greek), a founding member of UPENET, is a journal published, in Greek or English, by the Cyprus CEPIS society CCS (Cyprus Computer Society, <http://www.ccs.org.cy/about/>)

Computer-Supported Collaborative Learning (CSCL) is a research area that studies how Information and Communication Technologies (ICT) can support collaborative learning activities among students. The aim of this article is to synthesise the available literature and the recent trends in contemporary CSCL scholarship, whilst identifying the debates that make it such a fast-changing area. The social and cognitive dimensions are crucial for understanding how effective collaborative learning can promote self-motivation, critical thinking and development. In this context, both the strengths and challenges of CSCL systems are examined and suggestions for dealing with the latter are discussed.

Keywords: Benefits, Challenges, Computer-Supported Collaborative Learning, CSCL, Sociocognitive Aspects, Technical Facets.

1 Introduction

Unquestionably the arrival of the Internet, and other collaborative technologies, has presented appealing opportunities for interactive and flexible learning. People that transcend time, space, and cultural boundaries can communicate, work and learn together effectively through innovative applications and tools [1]. Despite the immense research efforts however, in many situations students still appear unmotivated to learn. Even more surprising is the fact that in the last decade the same challenges resurface and hinder Computer-Mediated Communication (CMC) regardless of the vast technological progress, the faster internet connections and the higher bandwidth available.

One explanation for this is the fact that most studies in the field of CSCL focus mainly on the technical aspects, whereas research related to the students’ learning experience and the academics’ teaching insights lags behind. This presents a genuine need for evaluating the current collaborative technologies and considering the sociocognitive aspects in conjunction with the technical facets of collaborative learning. This article explores the successes and challenges of CSCL systems in this context. Finally, ways for overcoming the challenges and capitalising the benefits of CSCL are discussed.

2 Strengths of Computer-Supported Cooperative Learning

Beyond enhancing classroom-based learning, technology has also been increasingly employed to support distant education, virtual lectures, and life-long learning. Even though the technologies behind video-conferencing, net-meetings, shared online applications, forums and intranets have been around for the last 20 years or so [2] it is only recently they were fully commercialised allowing educational institutions to purchase them and realise their full potential. Nevertheless, CSCL systems are not typically designed to replace academics or conventional teaching style; they are rather designed to supplement it [3].

CSCL systems are tailored for use by multiple learners working in the same workspace or across networked...
The Social, Cognitive and Technical Dimensions of CSCL.

Figure 1: The Social, Cognitive and Technical Dimensions of CSCL.

machines. Computer-supported learning environments can provide enduring and empowering benefits for learning, the most profound of which is flexibility [3], [4]. At the social level CSCL systems can support sharing ideas and brain-storming activities between group members, enable co-creation of knowledge, and increase group participation and involvement. Most importantly, CSCL creates more opportunities for socialisation and expands communication between students. Moreover, students can participate in online forums and discussions, watch recorded lectures remotely, or even take part in real-time virtual classrooms (where the lecturer may be in a different university or at a different country). This flexibility can create an engaging learning experience [5], [6], [7].

At the cognitive level, collaborative projects can motivate students to constantly learn from each other and develop their critical thinking [8]. It is also argued that CSCL systems facilitate knowledge acquisition and comprehension [8], [9]. When students are left to learn at their own pace and with their own mechanisms they find it easier to concentrate rather than following the lecturer’s mentality during a lecture. In addition, with the use of interactive online workshops learning can be more interesting and instructive [4], [10].

Many scholars argue that computer-supported collaboration between students may provide additional benefits compared to traditional, face-to-face collaboration. Recent studies show that ICT-mediated education is more informative than traditional learning practices. This is reasonable because CSCL systems offer easier access to information and learning materials and can provide real-time feedback on problem-solving activities. Another benefit from the technical point of view is the fact that the students’ familiarity with technology increases when they use such systems as part of their learning activities [4], [11]. Lastly, CSCL may provide a more expansive world to explore than traditional lectures. This promotes creativity and imagination which is essential for effective learning practices. All the above can increase the students’ academic achievement and, in turn, boost their self-esteem.

The discussion, however, should not be focused on whether computer-supported learning is better than traditional, non-technology-mediated learning; rather it should be on how we can best combine the benefits of both in order to achieve a truly beneficial learning experience. Traditional pedagogy and computer-supported learning can and should complement each other. The following figure shows the interconnections between social, cognitive and technological aspects of computer-supported collaborative learning.

3 Challenges of Computer-Supported Cooperative Learning

The increased availability of advanced educational systems, alongside the fact they have become more user-friendly and cost-effective, has transformed the ways people choose to communicate, learn and work with each other. Despite this progress however some problems have not been diminished. According to the literature this has both social and cognitive implications in addition to the more obvious technological ones. All these issues must be considered when evaluating a CSCL system.

From the social point of view, students often appear uninterested to use the technology firstly and most prominently due to lack of trust or incentives [2], [4], [11]. Secondly, group members often come from diverse backgrounds and have different cultural values and communication norms. This hinders the process of developing mutual understanding and building a common ground [12], [13]. Thirdly, students may find it hard to engage in spontaneous written communication which makes social interaction even more challenging. Social loafing, free-riding, groupthink and group shifts are also some of the social factors that obstruct collaboration performance [2]. Such negative behaviours are commonplace in collaborative learning, especially when technology is involved. Another challenge is that the use of technology often puts pressure on students to respond or participate to a group discussion within tight timeframes. This makes students with less technical experience feel they are in an inferior position which may eventually result in increased competition among students. Social interaction is an area which has attracted great research interest in an attempt to investigate why these issues are so persistent and how they can be dealt with [14], [15], [16]. The students’ behavioural and perceptual characteristics, that is, how they make sense of their learning experience, comprise another crucial issue which needs further investigation. Therefore, in addition to the social aspects, it is important to explore and understand the cognitive and behavioural elements involved in CSCL. First of all, different individuals are likely to have conflicting ideas or may formulate false or unclear expectations from the system. Secondly, the high complexity of the learning tasks often creates a huge gap between the ways different individuals interpret the requirements [17]. More effort will hence be required from the students in order to successfully collaborate under these circumstances. This creates anxiety and stress which can negatively impact the student’s learning experience. In effect, it can potentially lead to the technology’s rejection by the students.

Finally, one of the prevalent concerns from a technical point of view is the lack of appropriate training [5]. Even with the best technologies at hand if students are not adequately trained how to use the system then the team performance and the learning outcome
will significantly suffer [11]. Another concern has to do with selecting the right tools and applications for a specific learning activity. Furthermore, some learning activities require richer media than others and different students in the group may feel comfortable with different types of communication (audio, video or text-based). Hence there is also the issue of finding the right ‘task-technology’ fit [18]. Other challenges include technology limitations such as software failures, delays, and slow access times [1], [19]. These limitations constitute the most common factors that create user frustration. In spite of the advances in mobile communications and networks users still complain about the quality of communication over audio and video conferencing. In particular, figuring out who is speaking, what someone is referring to or where they are pointing at, adjusting the volume and focusing the camera to the speaker are some of the most frequent technical problems of distant communication. These problems result mostly due to the fact that technology is not regularly upgraded [2]. Since user needs are constantly changing and users are becoming more demanding, ergonomic issues such as the reliability, usability and usefulness of the applications used need to be constantly re-evaluated and improved.

### 4 Suggestions for Resolving the Challenges

Table 1 provides some suggestions for resolving the challenges discussed above.

### 5 Discussion and Summary

The quality of education is increasingly improved through the use of advanced technologies that support knowledge creation, communication and collaboration between learners. As a consequence, various CSCL systems that make use of these novel technologies have surfaced [5], [6], [7], [10]. This has resulted in a new paradigm for education which has shifted from ‘learning by watching’ to ‘learning by doing’. This new paradigm combines individual exploration with team learning for a more comprehensive educational experience. In order to seize the potential of these technological innovations, however, explicit attention to learner guidance and support is necessary [22]. Therefore, both the provision of a number of enabling tools and the development of fruitful collaboration patterns are required.

With respect to educational practices institutions must provide the right context including appropriate technical, pedagogical and social support. Appropriate collaboration guidelines should be developed to help students interact effectively in computer-supported collaborative learning activities. Additionally, system analysts and designers need to take into account the requirements and expectations of all user categories (students, academics, administrators, etc). They also need to create systems that are equally useful

---

**Table 1**: Suggestions for resolving the challenges of CSCL

<table>
<thead>
<tr>
<th>Limited social interaction [2], [10], [11]</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Combine the benefits of face-to-face and computer-mediated communication.</td>
</tr>
<tr>
<td>- Provide the right incentives and train team members to effectively use the technology.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lack of trust [1], [2], [11]</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Meet face-to-face when possible or at least once at the beginning of the group project.</td>
</tr>
<tr>
<td>- Agree on individual roles and set clear responsibilities.</td>
</tr>
<tr>
<td>- Ensure members share the same end-goals and establish common ground as early as possible.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lack of motivation to collaborate [2], [20]</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Provide the right training and explain the key functionalities of the CSCL system.</td>
</tr>
<tr>
<td>- Create a collaborative spirit, instigate commitment and build consensus within the team.</td>
</tr>
<tr>
<td>- Encourage new ideas and reward successful efforts.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lack of common ground and unclear expectations [1], [2], [19]</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Ensure that members share the same information and encourage knowledge sharing within the group.</td>
</tr>
<tr>
<td>- Set clear responsibilities and establish successful administration and coordination from academics.</td>
</tr>
<tr>
<td>- Have at least one face-to-face meeting and, where possible, use video-conferencing.</td>
</tr>
<tr>
<td>- Follow a structured communication approach such as dialogue structuring.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anxiety and lack of motivation to use the technology [2]</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Adjust the technology to different work patterns and customise it according to individual needs.</td>
</tr>
<tr>
<td>- Choose the most appropriate CSCL systems and applications for the tasks at hand.</td>
</tr>
<tr>
<td>- Promote the right attitude towards using the technology, provide incentives and appropriate training.</td>
</tr>
<tr>
<td>- Set clear responsibilities and follow well-defined learning processes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technology limitations [11], [21]</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Acquire high bandwidth depending on the number of users and the task at hand.</td>
</tr>
<tr>
<td>- Purchase user-friendly groupware with adaptable, customisable functionalities.</td>
</tr>
<tr>
<td>- Offer continuous software maintenance and technical support to users (both students and academics).</td>
</tr>
<tr>
<td>- Upgrade to the latest version of software and ensure everyone uses the same or compatible versions.</td>
</tr>
<tr>
<td>- Find the right technology-task fit.</td>
</tr>
</tbody>
</table>
(offer the right functionalities) and usable (easy to use) [24]. Most importantly, these factors should be addressed in conjunction to one another.

There is a genuine need to understand how the introduction of a CSCL system will change the education or work practices that are currently in place and what the impact of this might be. Hence the focus should be on identifying the desired relationships between people, tools, and tasks. Successful adoption of CSCL systems also requires ongoing evaluations and adjustments, not just initial adoption. This entails a multi-level evaluation of CSCL systems regarding the extent to which they enhance educational practices at each level (technical, social and cognitive). By identifying the problems that learners experience cognitively with CSCL systems, teachers and designers can be directed to consider more holistic interactions that are important to guide understanding within both socially and technologically rich contexts [22]. Future research should address these issues.

The available literature on collaborative learning is mainly theoretical and there are limited empirical data, mostly due to the novelty of these technologies [8], [11], [20]. Nevertheless, the fact that advanced CSCL systems are now installed in real-life educational settings presents appealing opportunities for future empirical and field studies. Studying everyday natural settings as opposed to laboratory experimental environments allows researchers to ‘see the world through the eyes of the participants’ and gain an in-depth understanding of why they behave as they do, what mechanisms they use to compensate for the lack of face-to-face interaction and, in essence, what makes them behave differently in technology-mediated learning activities [23]. Accordingly, when exploring such collaborative settings it is essential to adopt an exploratory, interpretive approach which collectively focuses on the behavioural characteristics of the users.

This article synthesises and critically analyses the literature on collaborative technologies and discusses the implications for their adoption in an educational environment. In particular, the opportunities as well as the constraints posed by ICT are considered. In addition, a list of guidelines for addressing these challenges is provided. These issues are explored from different viewpoints in order to understand how the technical, social and cognitive dimensions of collaborative environments can be better managed in order to stimulate a truly effective learning experience.

**References**


1 Introduction

Web accessibility is a matter of growing importance now that the Web has become an essential channel for publications (blogs, scientific articles, reports, and books), communication (the press, radio and television have a growing presence on the Internet), for corporate image and business, for interacting with governmental bodies, for education, and even for entertainment and social relations. The Web has also become a key channel for sharing information within organizations and performing collaborative tasks.

The information society has opened the door to improved information and communication, but it can also create new digital divides. Aware of this, the World Wide Web Consortium has for a long time been working to promote accessibility in this medium, and governments, especially in the USA and the European Union, have been very active in regulating this aspect. The World Wide Web Consortium’s Web Accessibility Initiative (WAI), created in 1991, promotes best practices for accessibility and publishes a number of guidelines for authoring tools (such as CMS, blogs, or editors like Dreamweaver), for browsers (Internet Explorer, Mozilla Firefox, Safari...), and for Web content (HTML, videos...). The latter type of guidelines, the Web Content Accessibility Guidelines (WCAG), are the best known, since they have been incorporated into various countries’ legislations as mandatory standards. The 2.0 version of these guidelines was eventually published (after 9 years of debate) on December 11, 2008 [1] and will be the development standard for websites being built today.

Legislation in several countries obliges the websites of public administrations and major service enterprises of general interest to meet WCAG standards, and in some countries this obligation extends to their intranets, so as to ensure the availability of accessible work places.
In this article we will be commenting on the most significant changes incorporated in version 2.0 of the standards, focusing on level A and level AA criteria, as they are the ones most commonly included in legislation of this nature.

2 General Differences between WCAG 2.0 and WCAG 1.0

The most significant difference between WCAG 2.0 and WCAG 1.0 is its orientation. WCAG 2.0 has been designed as a validation tool for information policy managers. The validation check points of WCAG 1.0 have become success criteria in WCAG 2.0 so that an accurate assessment can be made of whether or not a site is compliant. This has led to a much more normative text which is not so easy to read. In order to remedy this, the new WCAG comes with a great deal of pedagogical material, such as guides to help users understand each point, general techniques to aid compliance, and examples of best practices.

This new version also includes more guidelines for other types of disabilities such as low vision, limited movement… It should also be noted, in particular with reference to principle 4, that the guidelines are applicable to any tool that might appear in the future. Standardization and validation have also become more important as a way of guaranteeing versatility.

The organization of the guidelines has also changed significantly. WCAG is now organized around four principles (perceivable, operable, understandable, and robust), which break down into three levels of guidelines: level A (maximum priority), level AA (medium priority), and level AAA (minimum priority). Each priority level has its own success criteria. This new arrangement aims to place a greater emphasis on the principles underlying the guidelines, on their philosophy, and on moving accessibility more towards usability. As in version 1.0, the guidelines are accompanied by a glossary to define the main concepts, together with some recommendations regarding how to make a conformance claim.

With regard to conformance claims, the purpose of the guidelines has also changed in order to keep pace with how the Web has evolved. The "page" concept is beginning to lose its focus and for transactional websites the minimum unit of validation is now the "complete transaction" (for example: registration, purchase and payment). The guidelines provide a certain margin of compliance for content uncontrolled by the webmaster: advertising inserts and user-supplied content can be declared non-accessible (statement of partial conformance) or may be validated in a period of two business days (conformance claim based on best knowledge). Finally, a very significant change regarding the object to be validated is that in WCAG 2.0 the exclusive use of W3C technologies is no longer required.

This has opened the door to the validation of PDF documents and Flash videos, two of the most ubiquitous technologies on the Web, which up to now had not been properly taken into consideration by the guidelines.

3 New Features of the WCAG 2.0 Guidelines

We will now look at the new features of the latest version 2.0 of WCAG [2] for each element of a typical web page.

3.1 At the Head

There must be meaningful title for each page (success criterion 2.4.2, level A; general technique G88) [3].

The language of the page must be indicated (success criterion 3.1.1, level A) and, as for version 1.0, any language changes within the page should also be indicated (success criterion 3.1.2, level AA).

3.2 In the Body

Menu and navigation. Navigation has gained importance in WCAG 2.0; there is a complete guideline (2.4) dedicated to it. The site should be keyboard navigable (using the tab key) and users should be prevented from getting trapped on a page object (as used to happen with previous versions of Flash, for example) (success criterion 2.1.2 level A, general technique G21). It should be possible to jump directly to the content, without having to use navigation bars (success criterion 2.4.1 level A, general technique G123), and also to bypass groups of related links. A site map (success criterion 2.4.5 level AA, general technique G63) or a table of contents (general technique G64) should be provided. The sections should be organized and properly labelled with headings and markup (success criteria 1.3.1, and 2.4.6 level AA, general technique G130).

Video and audio. For previously recorded material, a text alternative (captions) should be provided (success criterion 1.2.4 level AA). In any case it must be possible to stop it, control its volume… (success criterion 1.4.2 level A). Guideline 2.2 provides for the possibility of adjusting the timing.

Content. Visual presentation of text should have a high text to background contrast ratio (4.5:1 for normal text and 3:1 for large print) (success criterion 1.4.3, level AA, general techniques G18 and G145). Links should be visually highlighted when they receive focus (success criterion 2.4.7 level AA, general technique G149). When mentioning an element or an action we should not base our description on its appearance (colour, shape, sound) to avoid discriminating against those with sensory disabilities (success criterion 1.3.3). Non-text elements, as in version 1.0, should be provided with text alternatives; this version of the guidelines defines the elements to be provided with alternatives more precisely. For example, CAPTCHA tests have been included. These tests, consisting of a question that can only be answered by a human and not a machine, are commonly found in forms to prevent robots filling them in (guideline 1.1, general techniques G143 and G144). Content readability, due to the difficulty of validating it, is now addressed at level AAA, although the guidelines recommend compliance.

Forms. Both the XHTML language and browsers have improved a great deal in terms of form semantics. With...
a more participative Web, forms represent a fundamental part of interaction. For this reason a large number of guidelines mention forms: to prevent an option in a form from changing the form’s content without prior warning (success criterion 3.2.2 level A; and success criterion 3.3.2 level A), to prevent anyone from inputting erroneous data in a box (success criteria 3.3.1 and 3.3.2 of level A), and 3.3.3 of level AA, general technique G83), to make the required data clear (success criterion 2.4.6 level AA, 3.3.2 level A, general technique G131), and to allow the user to select enough time to fill in the data or check the desired options (success criterion 2.2.1 level A, general technique G133). The creation of forms for launching Rich Internet Applications (RIAs), only obliquely mentioned in the WAI-ARIA guidelines, will be given more importance in the new WAI-ARIA guidelines.

Another set of guidelines promoted by the Web Accessibility Initiative (WAI) is the aforementioned WAI-ARIA (Accessibility of Rich Internet Applications) guidelines, which complement WCAG and are especially intended for websites using AJAX (Asynchronous Javascript and XML) or other Web interactive technologies. These guidelines are currently published as a Working Draft but, once accepted as a W3C Recommendation, they will be of great importance since it is becoming increasingly more common to use the Web as a virtual desktop.

PDF documents. The same principles affect PDF documents, so we need to mark the language of the document both as a whole and in its component parts (a difficult task in the case of Basque, Galician, and Catalan without Adobe Acrobat 9.0 Professional). We also need to ensure contrast, semantics (with tags), navigation, and the accessibility of forms.

Many of the individual guidelines that used to exist in WCAG 1.0 to address problems arising from certain technologies have disappeared; for example those relating to image maps, forms, frames, or some table-related issues, either because they are already covered in the new standards or because current browsers already support proper compliance.

4 Web Accessibility Implementation

The implementation of Web accessibility should form part of an integrated process of definition, design, maintenance and validation [4]. As we know from our experience of usability engineering, corrective actions after the event are very costly and are unsustainable over time. Website administration teams should therefore configure their site with care and, where appropriate, adapt their authoring tools, and carry out awareness and training actions for everyone involved in Web content. Ideally Web publication teams should have people with impairments on their staff, or at least access to such people on a regular basis as validators. Also simulation protocols, regular validations, and writing and design guidelines should be established for the content taking into account the accessibility criteria.

It is fairly common to find websites where a great effort has been made to conform with Web Guidelines Web but which, due to a lack of awareness of the needs of actual users, do not meet the spirit of the guidelines. Some common examples of such shortcomings in websites that, in theory, are accessible but in practice are not usable by people with impairments are:

- Providing alternative style sheets for large print texts without taking the trouble to create a liquid or versatile layout. Visually impaired users tend to increase the size of the page by as much as five times, and the alternative style sheets provided are rarely of any use to them.
- Putting alternative captions to images which are then repeated as titles. This forces voice synthesizer users to hear the same text twice over.
- Providing only small mouse click areas, even though an alternative keyboard access is provided. Older people with impaired motor skills like to access pages with the mouse so as to be “the same as everyone else” and not use keyboard alternatives [5].

As an aid to checking the correct application of Web accessibility guidelines, there are a number of semi-automatic validation tools on the market. At the moment most of them only refer to WCAG version 1.0, but already updated versions of the most commonly used tools are starting to appear, some of which are listed below:

- Web Accessibility Checker <http://www.achecker.ca/checker/index.php>, from the Adaptive Technology Resource Centre in the University of Toronto. The most complete tool at the moment, includes WCAG 2.0 in its tests.
- WAVE <http://wave.Webaim.org/>, which, while it does not claim to follow WCAG guidelines strictly, <http://wave.Webaim.org/help#guidelines>, does detect a number of accessibility issues. It includes some WCAG 2.0 tests along with other complementary ones.
- Web Accessibility Toolbar <http://www.visuausit.com.au/info.aspx?page=1569>DownloadOther, developed by Vision Australia, brings together a number of free standards validation tools, contrast analysis tools, guidelines analysis tools... These tools allow many WCAG 2.0 tests to be performed.
- TAW <http://www.tawdis.net/ingles.html?lang=en>, developed by the CTIC foundation (Spain), which features a version to check the conformance of content for mobile devices (http://validadores.tawdis.net/mobile/en/). They have just brought out a beta version for analysing WCAG 2.0.

5 In the Near Future

WCAG guidelines are only a small part of Web accessibility. To fill in the gaps, three new initiatives will shortly be playing a very important role:

- WAI-ARIA guidelines, applicable to Rich Internet Applications (basically AJAX) which provide a solution for new Web applications [6].
- WAI-AGE guidelines, which focus on the needs of older people, which are especially important given the demographic trend towards ageing populations in western societies. The work carried out up to now is limited to a compilation of existing standards and guidelines [7].

© CEPIS

GRADE Vol. X, No. 4, August 2009 77
The new PDF/UA (Universal Accessibility) standard, which has already been approved as ISO/AWI (Approved Work Item) 14289. This standard will enable PDF documents to be validated as accessible [8].

And finally we should take into account all the new guidelines which will shortly be appearing to make our content more versatile, guidelines which will be aimed at multi-channel publication. The application of XML and the Semantic Web will be fundamental to this new roadmap, one in which mobile devices, telephones, and e-books are blazing a trail as Web querying tools.

References


