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LIFE AFTER DIGITIZATION, DESCHOOLING SOCIETY — 2010 & BEYOND

Abstract. Schooling may now be considered to be an intrinsic part of the society. The term may be taken to cover all those formal institutions established to school young people from approximately the age of 7-11 (primary school), passing through 12-17 (secondary school) until, in the end, 18-21 (tertiary school). The schooling is aided and abetted by the use of prescribed (text)-books and the outcome is measured by the formal examination process. Conformity is the norm. Naturally, the young often rebel, in all kinds of different ways.

The purpose of the Newspaper is not only to provide "news" but more significantly to build up a particular view of the society amongst its "loyal" readership. The edited output is always subject to policy. The Book, on the other hand, is materially and socially different in nature. The time of its making, lasting perhaps a year or more, lends it an authority and offers a sort of cultural world view to its readers. In its guise of textbook it has been the basic foundation of all schooling (and still is). There are books that survive and endure; there are many others that do not.

The arrival of the Internet, and then the World Wide Web, and now the multimedia devices that free us from fixed location, all point towards a new social contract between teacher and student, and parent and school. How will the stamp of authority be given to those students who are successful in an Open Schooling Society?

In this paper we explore the extent to which the Web has been and can be used to facilitate the upskilling of those who have already been schooled. In particular we focus on the "hands across the cultural barriers," linguistic and ideological.

Keywords. deschooling society, Dublin Core, hyperlink, hypertext, learning web, multimedia, semantic web, technology enhanced learning.

1 Prelude

"After Zorka and Zagorka who went home about ten o'clock, escorted by Velimir and Ranko, the others too began to disperse. At last only Stiković and Nikola Glasičanin were left. These two were about the same age. At one time they had gone to school together and had shared the same lodgings in Sarajevo... Now the beautiful and wayward schoolmistress Zorka[1] had also come between them." [1](p.239).

Human beings need physical/social contact in order to learn. Such contact and learning begins in the bosom of the family unit and continues within that of the community or tribe.

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[1] Zorka Parvanova (Зорка Първанова) is the wife of the (current) President of Bulgaria. The note is intended to highlight the fact that the "womanly" name of the "wayward schoolmistress" of Andrić's (hi)-story is still in (common) use. A more subtle point to be made is the *intrinsic hyperlink* that we have now set up between a real person (the President's wife) and a fictional character from a story from another culture and another time.

The process of learning mimics the "Rise of the Human." First there is the aural, oral, tactile world. The latter ultimately leads to writing and reading, in modern times. There is no reading and writing without defined alphabet and it is exactly at this point that we connect with the "Bulgarian Phenomenon" of 1000 years that was canonized in 1976 (via the traditional means of the elevation of Cyril and Methodius [2][W][2] to be "Patrons of Europe" [3] p.74). One notes, *en passant*, the remarkable fact that the brothers referred to, were not Bulgarian!

Naturally, one will understand from the reference to the two brothers, Cyril and Methodius, that we are being pointed directly to the Cyrillic alphabet. From the "Patrons of Europe" one will further deduce the remarkable elevation of said two brothers to such prominence by the first Polish Pope (of Rome), thereby unifying in a significant cultural way the divided Christian Church between the Western Patriarchate (usual known as the Catholic Church or the Church of Rome) and the "original" Orthodox Church with all the other Patriarchates in the East. The selected quotations chosen from the famous work by Nobel Prize winner Ivo Andrić, "The Bridge on the Drina," connects that Cyrillic heritage of the Orthodox tradition with the Latinized form of the Serbo-Croatian language. In summary, the selected quotations from the Andrić book, and the setting of the SEEDI conference (2010) in Sarajevo, Bosnia and Herzegovina, where the paper was first presented, deliberately focuses a very general theme, the "Deschooling of Society", onto a very local region, the Balkans.

Organized learning in groups provides community and homogeneity of culture. Culture arises from such schooling. What was true in the beginning is true today. Schooling, although essential in cultural community building, is often considered to have a pejorative connotation. Let us begin with that famous text "Deschooling Society" [4] by Ivan Illich? From the brief Wikipedia text on the topic one notes that

> *"The book is more than a critique -- it contains suggestions for changes to learning in society and individual lifetimes. Particularly striking is his call (in 1971) for the use of advanced technology to support "learning webs."[5]"*

And a quick look at an online version of the text shows that Chapter 6 is entitled "Learning Webs". The word "web" was superseded by "network" and is back again in style with the World Wide Web. Whether web or network or some other term, the theme of deschooling society and the introduction of the "learning web" is back in vogue. In this text of almost forty years ago Illich proposed 4 kinds of networks by which a new type of learning might be fostered. These are quoted here, with a few salient comments of relevance to 2010:

Ж 1[3] "Reference Services to Educational Objects — which facilitate access to things or processes used for formal learning. Some of these things can be reserved for this purpose, stored in libraries, rental agencies, laboratories, and showrooms like museums and theaters; others can be in daily use in factories, airports, or on farms, but made available to students as apprentices or on off hours."

Is not Wikipedia a reference service to Educational Objects? Does not Project Gutenberg provide e-books for free, accessible world-wide? Is this not the thrust of the Digital Humanities efforts? And on a pointed note: Where are the Bulgarian language e-book resources? From the Free e-Books site [6], one is directed to Liternet [7]. Is that all there is? Curiously, our choice of the **Ж** symbol was subsequently discovered to have been used in a

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[2] For convenience and to conserve reference space, the [W] symbol denotes a Wikipedia page reference, usually in English. If, for example, Bulgarian needs to be emphasized then [W bg] may be used. For references to pages in the Bulgarian Wikipedia — Уикиридия, we use [У].

[3] Our choice of the Cyrillic letter **Ж** (pronounced like the French "je") is intended to evoke the symbol of network or web. The letter can be **read** as a coming together and a parting away.

Bulgarian novel "The Sign of the Bulgarians," released July 16, 2010. [8]

Ж **2** "Skill Exchanges — which permit persons to list their skills, the conditions under which they are willing to serve as models for others who want to learn these skills, and the addresses at which they can be reached."

It seems reasonable that certain (professional) Social Networking sites might be the ideal place in which to organize such listings! One classical resource is LinkedIn [W]. The author is already "linked in" [10].

Ж **3** "Peer-Matching — a communications network which permits persons to describe the learning activity in which they wish to engage, in the hope of finding a partner for the inquiry."

The European Union Commission already provides such facilities, such as for example, under its Framework programmes [11].

Ж **4** "Reference Services to Educators-at-Large — who can be listed in a directory giving the addresses and self-descriptions of professionals, paraprofessionals, and free-lancers, along with conditions of access to their services. Such educators, as we will see, could be chosen by polling or consulting their former clients."

The author has been responsible for two courses at the University of Dublin (Trinity College), hereinafter denoted by TCD, which are delivered and assessed by the Open Book and Internet-accessible methods: "Computers and Society" (a third year 1 semester course at Third Level: Computer Science, terminated in 2009) and "Numerical Methods & Advanced Mathematical Modeling" (a fifth year double semester course at Fourth Level: Interactive Entertainment Technology). Both are classical university courses that might be opened up to the entire world. The assessment component for both, is already well developed: an open book, Internet accessible exam paper. In this paper we propose to discuss a generalized framework based on the (now defunct) third year level course Computers and Society.

By generalized framework we mean 1) the listing and discussion of pedagogical devices employed to facilitate "deschooling" and 2) the exhibition of supporting Web technologies by which one "may lift all boats high."

2 Computers and Society

There is to be a single main textbook upon which the course is to be grounded. In the original TCD course *that* book was "The Internet Galaxy" [W], by Manuel Castells [W] [9] published in 2001. The title and to a certain extent some of the core ideas reflect the famous text of Marshall McLuhan [W]: "The Gutenberg Galaxy" [W] [10]. This idea of a one-book foundation for a course may seem a little bit restrictive. For so it is! But from this one book the student is expected to learn how to **break out** into other books and into the Internet and the World Wide Web. To assist the student in the choice of book **breakout** (neologism for "break out") to other books, the lecturer lists her/his own choice for the semester period in question. In the latest curriculum description (2008), this list comprised "The Age of Access" [11], "A Brief History of the Future" [12], and "Weaving the Web" [13].

For definiteness, let us focus on Chapter 7 of the core text "The Internet Galaxy," entitled "Multimedia and the Internet: The Hypertext beyond Convergence." The multimedia covered explicity (in 2000) were, in order: TV and then music, video, games, radio, newspaper, books, journals, and art. The subtitle "Hypertext beyond Convergence" points to the perceived wisdom of the time (2000) that convergence of multimedia would be grounded

on the (Web) TV. We now know that such an event did not happen at the time. Today, in 2010, certain TV media, such as the BBC, have evolved very focussed Web strategies. And after 10 years of expectation since the millenium year 200, we do have (the emerging) Apple TV, Google TV, and so on. The hypertext, which we may understand to signify the coming into existence of both the Internet and the World Wide Web, is at the time perceived by Castells to be "inside us" (p.202):

> *"Human culture only exists in and by human minds, usually connected to human bodies... So, the hypertext is not produced by the multimedia system using the Internet as a medium to reach all of us. It is, instead, produced by us, by using the Internet to absorb cultural expression in the multimedia world and beyond."* [14] p. 202.

Castells is basically asserting that the Deschooling of Society is already well underway. Let us now turn to just one of the many multimedia mentioned, the Newspaper, and explore that hypertext that is within us. Exploration is here carried within the framework of the course "Computers and Society." The reader will undoubtedly be able to translate to other Learning Frameworks.

Newspaper [W]: The primary newspapers used in the course were "The Guardian" [15] (first published in 1821) and its corresponding Sunday paper "The Observer" [16]. Of particular importance for the course dynamic were the special sections of the Guardian published on Monday (MediaGuardian [17]) and on Thursday (TechnologyGuardian [18]), and The Networker column of John Naughton published in the Observer [19]. Both papers are United Kingdom based. For Ireland we used the Irish Times technology section [20] usually published on Friday. The strategy was to buy the (physical) papers and to present them in class where the appropriate sections could be projected by camera scanner onto a large wall screen in theatre. The students were then shown the key points on the projection and urged to follow up the lecture with the corresponding online resources.

Life (in the past) was grounded by the dynamic (habit) of the purchasing/accessing the daily/weekly newspaper(s) of choice, over a period of roughly 150 to 200 years. That was, of course, still true in 2009, for people of a certain class and age. But now there is a very noticeable trend towards a web-based grounding, daily but not necessarily as well focused.

In the degree course, Computers and Society, these newspapers (physical and online media) were being used as secondary material to support the textbook. They were also the subject matter of the analysis of current society (within the British Isles). Specifically, from the book and the selected newspapers we would break out into the Newspaper world of our times with our own hypertext. In 2008-2009 we read about the revolution taking place: famous Newspapers (USA) going into (potential/actual) bankruptcy: the Chicago Tribune [W] (listed specifically because President Obama is from Chicago) and The Los Angeles Times [W]. With both, the name Sam Zell [W] was linked. The naming provokes breakout and subsequent questioning: Who is this? Why is he important? What is the message?

Вестник[4] [У]: Now let us imagine we wish to set up a course similar to "Computers and Society" in Sofia University? What might be the corresponding Newspaper recommendations, **specifically with respect to technology**[5]? What *method* might one use to get started? Let us use "The Internet Galaxy", as is, in English. (Perhaps, a partial translation

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[4] The author is keen on the state of the art (and culture) in/of Bulgaria. The reader may readily supply their own alternative newspaper analysis to another culture, not of the Americano-Anglican English variety. In other words any language other than English is also acceptable.

[5] It is important to note that in this analysis, the keyword *Technology* is being used as a filter for our analysis.

into Bulgarian, by interested students, might be undertaken?) The first step will be to find out what newspapers exist in Bulgarian (probably published in Sofia) and mentioned in the world of Wikipedia[6].

Here is a short list of results. Due to space limitations only brief comments can be made on each result obtained. Undertaking this little exercise we note that „24 часа" and „Дневен Труд" are listed on the Wikipedia page (in Bulgarian). But they do not (yet) have their own Wikipedia pages. What does this tell us about the state of (de)Schooling (and) Society in Bulgaria?

Дневник [У]: from the Wikipedia article we may move directly to the newspaper website [21] and find the Technology section[7]. It is noteworthy to find that "dnevnik is using Twitter." We are both followers, and have retweeted to our own followers. It is one more way to learn Bulgarian.

Сега [У]: there is now a link to a Technology section on the "Front Page" (literally First Page)[8]. (There was none in June 2009 and we had concluded then that Sega would not be eligible for inclusion in a BG Computers and Society course.) Today, the Technology section is still rudimentary.

Стандарт [У]: The "Main Page" does not have an obvious link to Technology. Not recommended.

Монитор [У]: The "Начало" page does not have an obvious link to Technology. However, a search for "технология" does produce results. Not recommended.

Новините днес [22]? Very cluttered front page! Website needs radical redesign! The technology page is given under "Технологии" [23].

DNES.BG Новини :: Технологии [24].

To complete this short section it is worth noting that Уикипедия does not yet provide a sufficiently rich collection of pages to support the proposed course. For example, consider the BG article on the „Лос Анджелис Таймс" [У]. It consists of about 6 lines of text. Here is an opportunity for students on the course to make a big contribution to their own culture with respect to Computers and Society.

3 Interlude

"Mustajbeg Hamzić's great white house awaited the visitor as a pleasant surprise at the end of that stony track that seemed as if it led nowhere. Mustajbeg had four daughters and one son, Nail. This Nail-beg of Nezuke, only son of a noble family, was among the first to cast an eye on Fata of Velje Lug." [1] p.106.

Localisation: Let us imagine that, given the venue of the SEEDI 2010 conference in Sarajevo, one were challenged to analyze relevant Newspapers for an Open Computers and Society course directed at local participants? Where would one start? Googling with

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[6] It is shocking to discover that the BG Wikipedia articles for the BG Newspapers are extremely rudimentary. At the very least, one would imagine that each Newspaper would "commission" a formal well-documented page to show off their product in their own language.

[7] The official title of the page is "Технологии, Джаджи, Интернет, Наука - Dnevnik.bg" obtained by extracting DC data. It is also noteworthy that UTF-8 encoding is used. I judge this Newspaper website to be First Class.

[8] The site apparently uses Windows-Cyrillic encoding. This is not good for DC core data scraping using the DCdot tool. Fortunately, one can manually switch over to an appropriate encoding with a browser such as Firefox, Chrome, and so on.

"Sarajevo + newspaper" in the Chrome browser quickly brings up an interesting aggregator site: onlinenewspapers.com [25]. One is presented with the list of 17 possibilities[9]:

1. Balkanske istraživačke mreže [27] [in Croatian]
2. Bosnian Institute News [in English] — **not** a Newspaper [28].
3. Dani [in Croatian] [English available] — **not** a Newspaper [29].
4. Dijaspora Bošnjačka — Bosnian Media Group [30].
5. Dnevni Avaz — a *candidate*[10] for the Computers and Society [31].
6. Dnevni List — a Newspaper [32]
7. e-Novine.net — a *candidate* for the Computers and Society [33].
8. Glas Srpske [34, 35]
9. Izbor iz stampe — appears to be no longer in print.
10. Jutarnje Novine (formerly **V**ecernje Novine) — no longer in print [36].
11 Ljiljan — a News magazine, no longer in print [37].
12 Nezavisne Novine — a Newspaper [38, 39].
13 Oslobodjenje (Sarajevo) — a Newspaper [40, 41].
14 Oslobodjenje (Sarajevo) — seems to be duplicate of 13 above.
15 Slabodna Bosna — a Newspaper [42].
16 Svjetlo Rijeci — **not** a Newspaper; a "holding pen" page.
17 Ultimatum! — not a Newspaper [43]

Research has shown that even without knowledge of the language in question one is able to deduce with the aid of a tool such as DCdot which sites might be Newspaper sites. Post SEEDI 2010 in Sarajevo, one might then turn to a different conventional source such as the list of "Regional Publications" in Robert Thomas' book "Serbia Under Milosevic: Politics in the 1990s" [35].

Video: In addition to Newspapers, it is perhaps just as important to look at the potential use of Video online. Here we give one simple example from **T**echnology, **E**ntertainment, **D**esign (TED) [44], "One Laptop per Child" [45] presented by Nicholas Negroponte [46] of MIT Media Lab fame. This particular video clip is chosen to illustrate the subtitling in Bulgarian.

But how will we find the video we want for a particular aspect of the course? We take it for granted that everyone now knows about YouTube and Vbox… But such sites only came into existence in 2004 or later. And 2004 was also the year in which the Semantic Web Language (OWL) was released to the world.

Let us turn now to the technology side of the business. How are we to find stuff that we need? Yes, Google search does work! But it requires human input. The real purpose of the Semantic Web is machine to machine communication.

4 CIDOC-CRM, OWL 2.0 and the support of Protégé 4

It is for the Guardian Newspaper to determine how it ontologizes itself with respect to its own business. There is an implicit ontologization already determined by the actuality of the layout of the website. A quick glance impresses. Its own ontology is superbly determined. Whether or not it is conformant with either the CIDOC Conceptual Reference Model [W] or with OWL 2.

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[9] There is a small list of Newpapers on Wikipedia 26. Wikipedia. *List of newspapers in Bosnia and Herzegovina*. [cited 2010 March 5]; Available from:
http://en.wikipedia.org/wiki/List_of_newspapers_in_Bosnia_and_Herzegovina.
[10] Title given by DCdot: "DNEVNIAVAZ.BA - Dnevni portal za vas!" There is a technology section at
http://www.dnevniavaz.ba/tehnologija

The general interested reader/user of the Guardian Newspaper comes to it with a personal ontologization (often referred to as a folksonomy) determined by need and use. For example, one might be aware of the significance of the person "Stephen Fry" [W] (within the general UK culture) and his role in promoting an Open Source Society with respect to computing. At the time of writing, there is no knowledge of him in the Bulgarian Wikipedia (Уикипедия) [47]. From this perspective Stephen Fry does not exist.

For practical work we are currently using the Erlangen OWL encoding of the Top-Level CIDOC CRM [48]. To show how this is used we give a short relevant example below. We are using version 4.0 of the Protégé OWL editor [32] from Stanford. One of the nice features is the possibility of using the Dublin Core tag set [49] as annotation. In the analysis of web pages of Newspapers, for example, it is useful to see to what extent they avail of the **15** tags of the Dublin Core. For this purpose, we are using a nice tool, DC-dot, from the University of Bath, UK [50]. Application of DC-dot to the Technology section of Dnevnik (listed above) gives the result:

Title: Технологии, Джаджи, Интернет, Наука - Dnevnik.bg
Subject or keywords: Дневник; вестник Дневник; dnevnik.bg
Type: Text
Identifier: http://www.dnevnik.bg/tehnologii/

The most noteworthy aspect is that the keyword for Technology is not listed. It is clear that the subject or keywords are not specific to the content. That is bad! For comparison running DC-dot on the Irish Times Technology section (same date) gives:

Title: The Irish Times — Technology
Subject or keywords: laptop; hatchback; Wimbledon; TECHNOLOGY; Family; fun; October; print; 12:52; autumn; Goosen; million; Teanga; power; survival; home-owners; won; cinema; life; Outside; Terms; locations; storyteller; WIRELESS; period; male; reviews; light; Property; Cable; technology; belated; togs; economic; Pursued; Smarter; Premium; licence; Competitions; sudoku; Feeds; Jobs; mobiles; operator; WIRED; Depth; Cities; Reddan; version; access; firm; Entertainment; Science; continental; Simplex; eating; Crosaire; provide; throughout; Economy; week's; network; driving; Video; frugal; remote; record; SMART; policy; Asavie's; […16 more lines of keywords]; INBOX; laptops; ban; Web; publishes; week; Culture; fresh; IRANIAN; Bulgaria's; [… 29 more lines of keywords]
Date: 2009-06-26
Type: Text
Format: text/html; charset=US-ASCII || 35893 bytes
Identifier: http://www.irishtimes.com/technology/

Note that *45 lines of keywords* have been deleted above to conserve space. Finally, we also do a run of DC-dot on the Guardian Technology section:

Title: Technology news, comment and analysis | Technology | guardian.co.uk
Subject or keywords: Technology; Technology
Description: Latest technology news, comment and analysis from the Guardian, the world's leading liberal voice
Type: Text
Format: text/html; charset=UTF-8 || 158958 bytes

Of the 15 Dublin Core elements, that one which lists "Subject or keywords" seems to be the primary element for folksonomy and ontology. Hence, to discover that on the

"Technology" page in "The Irish Times" one has 2 pages worth of keywords (most of which seem to be irrelevant) is disconcerting. On the other hand, the "admired" Guardian, returns simply "Technology; Technology". Clearly we have stumbled upon a serious problem in the use of the Dublin Core with respect to integration with the Semantic Web. A research project is indicated.

5 Wikipedia Editing

Editing Wikipedia articles is very time consuming. The first author has been an editor of Wikipedia since approximately May 2008. From (limited) experience, since Wikipedia will be heavily used by both teachers and students, then it is important that the teacher, at least, ought to be comfortable in editing those articles in which (s)he is interested professionally. Like the teaching profession itself, editing is also learnt both by theory and by practice. To grasp the full potential of what serious professional editing involves one might find it convenient to have access to the "Missing Manual" [51]. Finally, from a sociological perspective, it is strongly recommended that the teacher preserve full standard anonymity in editing (in order to avoid bias, vandalism, and so on, from both peers and students).

To illustrate a simple editing task: on June 25, 2009 the article on **Вестник** [У] listed Монитор [У] as one of the Newspapers. It was clickable. However, the link on that date took one to the computer Монитор [У] instead of the newspaper. The second author fixed the link and the outcome may be verified on the history page "Преглед на историята на „Вестник"" [У]. Technically, the change made was a simple transformation from [[Монитор]] to [[Монитор (вестник) | „Монитор"]], obvious to an editor but clearly like hieroglyphics to the uninitiated. To learn how to do such a simple task with confidence will transform our world. We need thousands of BG-savy Wikipedians to lift the culture to its rightful place in Technology Enhanced Learning in 2010.

6 Postlude

"So the second part of that summer day, which should have been a festival, was transformed into a bewildered, bitter and frightened expectation.

On the kapia, instead of a festival mood and the gaiety of men released from work, there was the silence of the dead… A soldier in a new uniform paced slowly from the sofa to the spot where… The next day, beneath the plaque with the Turkish inscription, a white official notice appeared… It announced the news of the assassination and death in Sarajevo of the Crown Prince and expressed the indignation roused by this evil deed. None of the passers-by stopped to read it, but passed in front of the notice and the guard as quickly as possible with lowered heads." [1] (p.280-1).

A very brief account has been given of some of the different technologies that were daily utilized in the undergraduate course, "Computers and Society". The same technologies are now also employed in the Master's Course "Numerical Methods and Advanced Mathematical Modeling." Editing Wikipedia for the latter is significantly more challenging and just as fruitful.

We gratefully thank the anonymous referees who spotted some bad "double entry" text errors on our part. We hope that in correcting these, we did not introduce others.

Finally, we would like to reveal here that "both authors" of the paper are indeed the same person. In particular, the Bulgarian name "Михал Орела (Mihal Orela)" is a pseudonym (pen name) of Mícheál Mac an Airchinnigh. Mihal Orela is the editor of Wikipedia articles whether in English, Bulgarian or others.

References

1. Andrić, I., *The Bridge on the Drina*. 2000, Beograd: Dereta.
2. Wikipedia. *Cyril and Methodius*. [cited 2010 2010-02-21; 2010-07-17]; Available from: http://en.wikipedia.org/wiki/Cyril_and_Methodius.
3. Pavlov, P., A. Orachev, and A. Khandzhiski, *Bulgarian script : a European phenomenon*. First ed. 2008, Sofia: Borina. 79 p.
4. Illich, I. *Deschooling Society*. 1970 [cited 2010 2010-03-01; 2010-07-17]; Available from: http://ournature.org/~novembre/illich/1970_deschooling.html.
5. Wikipedia. *Deschooling Society*. [cited 2010 July 17]; Available from: http://en.wikipedia.org/wiki-/Deschooling_Society.
6. *Free e-Books*. [cited 2010 July 17]; Available from: http://www.e-book.com.au/freebooks.htm#5.
7. *Liternet (bg)*. [cited 2010 July 17]; Available from: http://liternet.bg/.
8. Недков, Д., *Ж, Знакът на българина (The Sign of the Bulgarians)*. 2010, София: Издател: Стандарт
9. Castells, M., *The Internet galaxy : reflections on the Internet, business, and society*. 2001, Oxford ; New York: Oxford University Press. xi, 292 p.
10. McLuhan, M., *The Gutenberg galaxy : the making of typographic man*. 1962, Toronto: University of Toronto Press. 293 p.
11. Rifkin, J., *The age of access : the new culture of hypercapitalism, where all of life is a paid-for experience*. 2000, New York: J.P. Tarcher/Putnam. 312.
12. Naughton, J., *A Brief History of the Future, The Origins of the Internet*. 1999: Phoenix.
13. Berners-Lee, T. and M. Fischetti, *Weaving the Web : the original design and ultimate destiny of the World Wide Web by its inventor*. 1st pbk. ed. 2000, New York: HarperCollins Publishers. ix, 246 p.
14. Castells, M., *The Internet galaxy : reflections on the Internet, business, and society*. 2001, Oxford: Oxford University Press. xi, 292.
15. *The Guardian (guardian.co.uk)*. 2009 [cited 2009 June 17]; Available from: www.guardian.co.uk.
16. *The Observer (guardian.co.uk)*. 2009 [cited 2009 June 17]; Available from: http://observer.guardian.co.uk/.
17. *Media Guardian*. 2009 [cited 2009 June 22]; Available from: http://www.guardian.co.uk/media.
18. *Technology Guardian*. 2009 [cited 2009 June 25]; Available from: http://www.guardian.co.uk-/technology.
19. Naughton, J. *The Networker*. 2009 [cited 2009 June 21]; Available from: http://www.guardian.co.uk-/profile/johnnaughton.
20. *The Irish Times Technology*. 2009 [cited 2009 June 25]; Available from: http://www.irishtimes.com/technology/.
21. *Dnevnik*. [cited 2010 February 23]; Available from: http://www.dnevnik.bg/.
22. *Новините днес*. 2009 [cited 2009 June 25]; Available from: http://www.bg-news.org/.
23. *Технологии*. 2009 [cited 2009 June 25]; Available from: http://www.bg-news.org/news_7.
24. *DNES.BG Новини :: Технологии*. 2009 [cited 2009 June 25]; Available from: http://www.dnes.bg/index.php?cat=4.
25. *Bosnia Herzegovinan Newspapers : Newspapers from Bosnia*. [cited 2010 February 23]; Available from: http://www.onlinenewspapers.com/bosnia.htm.
26. Wikipedia. *List of newspapers in Bosnia and Herzegovina*. [cited 2010 March 5]; Available from: http://en.wikipedia.org/wiki/List_of_newspapers_in_Bosnia_and_Herzegovina.
27. *Balkanske istrazivacke mreze*. 2010-02-23; 2010-07-15 [cited 2010 February 23]; Available from: http://www.bim.ba/.
28. Bosnia Institute. *Bosnia Report*. [cited 2010 February 23]; Available from: http://www.bosnia.org.uk-/bosrep/default.cfm.
29. *Nezavisni magazin BH DANI - ONLINE*. [cited 2010 February 23]; On line izdanje najutjecajnijeg bosanskohercegovачкog magazina]. Available from: http://www.bhdani.com/.
30. *Dijaspora Bosnjacka ("Bosnian Media Group")*. [cited 2010-09-19; Available from: http://www.bosnianmediagroup.com/.
31. *Dnevni Avaz*. [cited 2010 February 23]; Available from: http://www.dnevniavaz.ba/.
32. *Devni List*. [cited 2010-09-189; Available from: http://www.dnevni-list.ba/.
33. *e-Novine*. [cited 2010 February 23]; Available from: http://www.e-novine.net/tehnologije.html.
34. Lukic, Z. [cited 2010 March 2]; Available from: http://www.glassrpske.com/.
35. Thomas, R., *Serbia Under Milosevic: Politics in the 1990s*. 1998, London: C. Hurst & Company.
36. *Jutarnje Novine*. [cited 2010 March 5]; Available from: http://www.mediaonline.ba/en-/vijesti.asp?ID=511.

37. Wikipedia. *Ljiljan*. [cited 2010 March 4]; Available from: http://en.wikipedia.org/wiki/Ljiljan.
38. Wikipedia. [cited 2010 March 5]; Available from: http://en.wikipedia.org/wiki/Nezavisne_novine.
39. *Nezavisne Novine*. [cited 2010 March 5]; Prvi nezavisni dnevni list Bosne i Hercegovine - First independent daily newspaper in Bosnia and Herzegovina]. Available from: http://www.nezavisne.com/.
40. Wikipedia. *Oslobođenje*. [cited 2010 March 5]; Available from: http://en.wikipedia.org/wiki-/Oslobođenje.
41. *Oslobodjenje BiH*. [cited 2010 February 23]; Available from: http://www.oslobodjenje.ba/.
42. *Slabodna Bosna*. [cited 2010-09-19; Available from: http://www.slobodna-bosna.ba/.
43. *Ultimatum!* [cited 2010 July 14]; Available from: http://www.ultimatum.20m.com/.
44. TED. *Technology, Entertainment, Design*. [cited 2009 June 29]; Available from: http://www.ted.com/.
45. Negroponte, N. *Никълъс Негропонте за "Лаптоп за всяко дете", две години по-късно*. 2007 [cited 2009 June 17]; Available from: http://www.ted.com/talks/lang/bul/nicholas_negroponte_on_one-_laptop_per_child_two_years_on.html.
46. Negroponte, N. *One Laptop per Child*. 2008 [cited 2008 Jan 14]; Available from: http://web.media.mit.edu/~nicholas/.
47. W bg. *Уикипедия*. 2009 [cited 2009 June 25]; Available from: http://bg.wikipedia.org/wiki-/Уикипедия.
48. Schiemann, B., M. Oischinger, and G. Görz *Erlangen CRM Version 2009-03-30*. 2009 [cited 2009 Apr 15]; Available from: http://www8.informatik.uni-erlangen.de/IMMD8/Services/cidoc-crm/erlangen-crm_090330_5_0_1.owl.
49. DCMI. *Dublin Core Metadata Initiative*. [cited 2009 June 26]; Available from: http://dublincore.org/.
50. Powell, A. *DC-dot*. 2000 [cited 2009 June 26]; Available from: http://www.ukoln.ac.uk/metadata-/dcdot/.
51. Broughton, J., *Wikipedia, The Missing Manual*. 2008, Sebastopol, CA 95472, USA: O'Reilly Media, Inc.

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