REPORT

OPEN EDUCATIONAL RESOURCES IN MACEDONIA

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I. ANALYSIS PLAN

Analytical Context:

The present analysis is focused on the concept "Open Educational Resources" (hereinafter: OER) and application, multiplication and distribution of available open educational resources. In compliance with *UNESCO* Recommendations from 2002[1], developing countries should focus on enhanced advancement of: (a) free use of educational materials and open resources for all; and (b) securing their futher free distribution on the basis of "defined copyright principles"[2] which promote free distribution of education plans and enable multiplication and reproduction thereof.

Analysis Objectives:

The present analysis aims to localize the issues related to open educational resources and examine the state of affairs as regards OER in the Macedonian education and societal system. It also defines the key actors in the establishment of operational and useful OER. The analysis, in addition to the reasearch of OER development and availability in education, also targets the development of the information system and educational information technology in the country.

The legislative framework that regulates and conditions OER development and application will also be elaborated as part of the research (*Law on Primary Education, Law on Secondary Education, Law on Higher Education, Law on Adult Education, Law on Textbooks for Primary and Secondary Education, Law on e-Governance, Law on Free Access to Public Information, "Concept on Nine-Year Primary Education", national strategies on developing education and e-contents,* as well as other laws and regulations that regulate education and information society development).

In addition to the legislative framework, the present document will provide description of institutions and actors that are competent or should be competent in this field, as well as their relevant roles in the process and will provide a comparative analysis of OER institutional set-ups in other countries that have developed open educational resources. As part of the legislative and institutional framework analysis, suggestions and recommendations are provided and aim towards introduction of conceptual changes that would provide OER-*enabling conditions*.

The analysis includes a separate chapter on the state of affairs as regards Internet availability of academic contents for higher education, notably in the form of journals, inventories/collected works, analyses and other types of professional and specialized magazines, both domestic and foreign. It will provide an overview of the main challenges and problems in this field, and will also provide guidelines on improving and developing OER technologies at this education level.

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[1] UNESCO's 2002 "Forum on the Impact of Open Courseware for Higher Education in Developing Countries".
[2] The so-called "Open Educational Licenses".

Methodology

The analysis was performed by means of in-depth contents analysis of materials available and regulations governing OER and analysis of the education and information society. It includes a comparative analysis of the state of affairs in other countries. Direct interviews were carried out with responsible persons and instititions in Macedonia. The analysis is non-restirictive as regards the education level, i.e., it includes all education levels in Macedonia.

Analysis Goals

The goal of the present research is to provide a comprehensive set of recommendations aimed to advance the concept of "Open Educational Resources" and its position and usability in the Macedonian education system.

Analysis Timeframe:

The analysis was carried out in a period of 6 (six) weeks during the months of October and November 2010.

CONTENTS

1.   RECOMMENDATIONS

- The general assessment of this report is that in the Republic of Macedonia there are activities, projects and developmental efforts that address and partially generate the concepts of "Open Educational Resources" (OER). Nevertheless, these activities are sporadic, non-coordinated and non-systematized to be able to achieve serious break-through in the implementation of the major project titled "open education". Activities are organized by different actors: state institutions, foreign and international donors, non-governmental organizations, and even include in-country private initiatives implemented by groups and individuals. There are no pillars that would provide functional integration of such scattered activities. The integrator thereof should be an inclusive model that would unite the efforts of key actors and should encourage cooperation and coordination. A coherent system on technology, software, policies, projects and new OER contents generation should be developed and implemented.

- Models on OER-related activities coordination and integration should target users, individuals or groups, and not only the entities in the field of OER production. This would imply existence of on-line services or websites that would facilitate use of available OER. Use of such contents should be transparent and simple, while such "nodes" in Macedonia should enable OER use by means of indexes, content links and accessibility.

- Contents and number of different areas in the so-called "digital educational repositories" or "educational and scientific on-line archives" need to be enriched, as well as the related websites under construction, by means of projects implemented by state institutions in the Republic of Macedonia and by other local, private, foreign and international entities that work in the field of education, science, international cooperation and ICT. Coordination and cooperation are needed in the light of increasing scope and quality of contents, in particular materials of higher scientific and research value.

- It is recommended to open the archives of educational and scientific materials funded from taxpayers' money. Double funding of such materials is a practice that cannot be justified due to different reasons and is detrimental to the public interest and the education process.

- The public institutions, represented by the Government, line ministries and their bodies, should be primarily focused on service provision for citizens and education and scientific entities, rather than support for commercial-based entities that consequently produce scientific and educational contents and charge and sell end users for them.

- It is recommended to intensify the activities on conversion and publication of scientific works archived as Master or Ph.D. Theses, scholar articles for inventories/collected works and periodicals published by scientific and educational institutions and to make them available for easy and free non-commercial use.

- It is recommended to facilitate registration and access to educational and scientific on-line archives and fully liberalize their use, as well as to eliminate different technical and system restrictions that negatively affect the scope and efficiency of their utilization. Limiting access or immediate use by means of memberships should be minimized, while the principles and goals governing the use of such materials should be unified and transparently presented to all stakeholders.

- It is recommended to pursue regional and international cooperation, in particular networking of contents banks and in that use models that can be upgraded on the basis of existing or newly established databases.

- OER concepts and goals should be incorporated in the legislation that regulates the education process in the Republic of Macedonia. Formal and legislative references to international declarations and norms should be further developed as part of the systematic implementation of OER in education in the Republic of Macedonia, although it has to be noted that pilot efforts have already been implemented in that regard.

- Developing OER concepts and their adherent application is closely related to ICT training and different levels of media literacy. Further efforts are needed to intensify training and exchange of experiences between users. Training targeting stakeholders should be comprehensive on all levels of education, scientific and research activity and OER (technical, academic, software, etc.). Training should be tailored to suit the needs of different groups of participants.

- It is necessary to reconsider the Law on Copyrights *vis-à-vis* OER and to amend and adjust the relevant legislation in light of OER concepts and goals that are affirmative and progressive for the education and the society as a whole. Regulation of copyrights in scientific and educational contents funded with public funds and of general interest should be distinguished from private and commercial contents in a precise and unambiguous manner. Considerations, comparative analyses and local application of experiences related to "copy left" projects, as well as encouraging and supporting activities taken under *Creative Commons* licenses represent a solid solution to the current situation that inhibits and "suffocates" open and creative use of educational contents and tools. Exemptions thereof should be precisely defined, as well as their future treatment.

- As for free textbooks, despite the serious resources invested in their development and distribution, there is no systematic coordination of activities taken under different projects and aimed towards a common goal: free textbooks for all, facilitated dissemination of knowledge and facilitated education in a country whose poverty rate is currently at 30%. Such projects have been and are successfully implemented in the neighbouring countries (for example, Republic of Bulgaria). Regional and international exchange of experiences at different levels is more than recommended. Visible is the negative distinction between "easy educational contents" whose free distribution is justified and "complex scientific contents" that are almost fully exempted from public circulation and availability, although most of them are financed with public funds and their educational and research capacity and meaning are by far more relevant for the education system development. Such distinctions should be avoided and should be based on recommended OER concepts or *Creative Commons*.

- New media and the so-called *Web 2.0* open broad space for creative use of digital tools and free services and resources. Frequent use of possibilities offered by Internet and new media was noted, as well as enhanced application thereof in innovative and creative teaching and learning. Teachers with certain computer literacy and knowledge more frequently utilize the possibilities offered by these services in their instruction delivery, but also in communicating with students' parents. This process can be supported and intensified with additional relevant computer literacy training and exchange of experiences by means of different forms of associations based on direct or computer-facilitated communication. The present analysis reconsidered the contents generated on *Wiki* and *Moodle* platforms, but these activities and projects can be expanded to many related platforms and projects that enable realization of same or similar goals.

- Enhanced open software promotion and support in education and continuous training are more than needed. Building the culture of open source software and contents in education and science is a key component in developing an environment that is conductive to OER development.

- Standardization of software tools is needed for the purpose of generating contents, courses, programmes and like. Such standardization should also facilitate access to OER.

2. INTRODUCTION:

2.1. Worldwide experiences confirm that education development is closely related to the use of contemporary technology. Integration of contemporary technology in the education process is a method that has been continuously pursued by countries with highly developed and prestigious education systems, while the results thereof are quality education and educated staff adjusted to the society and labour market needs in the relevant country. Nevertheless, as regards the comprehensive education system development the indicated worldwide experiences point out to two key components: (a) continuous modernization of educational contents; and (b) facilitating access to educational tools and contents. Such threefold approach enables quality and sustainable development of education, which by means of co-action pursued by these actors secures continuity in the societal development and success.

2.2. Internet is of central importance as regards current developments in education. The strong and broad integration of Internet in the education process is a global trend, but also a firmly defined developmental direction, in particular for countries that aspire to improve their education systems. Societies, and especially their respective education sectors, are faced with thorough changes and reorientation towards the so-called "knowledge-based economies"[3]. Nevertheless, it has been demonstrated that the process of Internet integration in the education system has its own shortcomings and inconsistencies, which are often reflected in the fact that its implementation has been reduced to technology use, while development and availability of scientific contents are not in the focus of these developments or have been fully disregarded. This disbalance creates a series of anomalies that will be addressed in detail further in the report. On the other hand, availability of educational contents and educational aids and tools[4] (hereinafter: educational resources or ER) is often limited due to a series of practical systematic and financial problems. Rossini (2010: 4) says that: "education policies and projects that combine infrastructure investments with coherent projects on contents networking are the ones that have the greatest positive effect and achieve the goals of inclusive education". The formula needed for this type of efficient education process includes "open technologies, software platforms that enable creative programming, right to content use, as well as broad dissemination of abilities and tools needed to exercise these rights" (ibid.).

2.3. In such situations, the concept of "Open Education Resources" is of crucial importance. Problems that emerge in regard to the use of educational resources mainly concern the restrictive use thereof, i.e., the limited use of educational resources by smaller groups or individuals. OER

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[3] In English: Knowledge Based Economies.

[4] For the purpose of this research and the literature consulted, the term education aids and tools shall mean educational and scientific literature, textbooks, manuals, magazines and other, both in hard copy or electronic form, as well as computer-software tools in the broad scope from hardware components to specialized programs and databases (author's note).

operate along these lines by defining educational materials as "pubic and common goods"[5]. These groups or individuals use education resources due to their job positions or due to their involvement in particular education institutions. In a system like this, access to educational resources for other users is either expensive or the so-called "creative use"[6] is not allowed due to a group of factors that include copyrights, limited or partial access to contents, insufficient transfer and conversion of resources into electronic formats, etc. Some of these problems of equal access to education in the Republic of Macedonia have been addressed by particular projects, such as the Ministry of Education's project "Free Textbooks", whose implementation started in the school year 2009/2010, projects implemented as part of EU accession and integration process, etc. However, the realization of these and related projects is accompanied with series of problems emerging at different implementation levels, such as the quality of textbooks, insufficient number of copies, late distribution of textbook materials, insufficient interest on behalf of the teaching staff as regards textbook production, lack of training for the teaching staff as regards efficient realization of projects, etc. As regards the system aspects, these projects are accompanied with shortcomings related to quality of education, variety of educational contents and tools, inconsistencies related to their timely delivery, exclusion of groups and individuals who are not included in the public education, etc.

In addition to activities and projects implemented as part of public education in the Republic of Macedonia, other system shortcomings that can be identified and that should enable proper operation of the principle of equal access to education include the public libraries and on-line databases at education institutions. Their operation is also characterized by series of problems ranging from material-technical to planning-strategic problems, which relativize the affirmative role of public libraries and on-line databases in enabling open and equal access to education. Although the use of educational contents from public libraries does not imply major costs, the system thereof is still burdened with anachronous formal procedures, such as for example the status of university student or primary or secondary student, and thereby additionally complicates the weaknesses identified in the public education and limits full access to OER. As for availability of electronic educational contents, it can be said that they are modest, both in terms of their scope and quality. Interconnection of actors in the education process is still on low level.

2.4. Against this background, urgent is the need for systematic and planning development approach as regards the openness of the education process, which should be translated into higher quality education tailored to suit the societal factors and labour and knowledge markets. Education's inclusiveness and freedom to use educational resources provide enough space for improvements and further development. Similarly, on-line databases, electronic educational

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[5] Rossini, pg. 17.
[6] Creative use refers to the process of open use of educational resources aimed to adjust knowledge to factual problems faced by the individuals that use them.

contents and open source software for education – in their current capacity – fail to make full use of their system abilities. OER gain in importance given that Macedonia is a country in development and is characterized by a high poverty rate and thus requires higher rate of utilization of open resources and free educational tools and contents. In continuation, the present document will examine the situation as regards OER in the Republic of Macedonia, OER possibilities in terms of implementation of open and quality education, and will provide recommendations for further implementation and integration of OER in the country's education system.

3. OER CONCEPTS

3.1. Information society development and broad distribution of information technologies have contributed to the change of manner in which education is delivered and have opened new possibilities. At the same time, new possibilities challenge the already established methods, practices and regulations concerning the education process, but also trigger resistance to changes in the established education system. OER attempt to overcome these barriers, imposed in the form of copyrights, selective physical access, user passwords, etc. They attempt to intensify the process of progressive changes, for the purpose of achieving openness and inclusiveness in education[7].

The factual situation indicated by a series of researches[8] is reduced to accumulated materials and databases that have been closed up in systems protected by different mechanism and are available only to certain individuals or selected groups in the society. Such trends are contrary to cultural and societal changes brought to light with the use of Internet and the possibilities it offers. The inclusiveness and openness promoted and practiced by the Internet, as well as by new information technologies, are insufficiently and inefficiently applied in education, although global education bases its reform process on the intensive use of information technologies and Internet. In that process, the number of digital materials[9] that support education and scientific-research activities is rapidly growing. Nevertheless, the existing system is faced with the inability to channel and impregnate such newly generated resources.

3.2. In terms of chronology, the OER concept is built on the basis of <u>David Wiley</u>'s term[10] "open content"[11], promoted by the end of the 20th century. Wiley's syntagma expanded the idea on the active connection between the principles underlying the open source software movement[12] and the movement advocating for open contents, in particular educational contents. Wiley actively participated in the creation of the broadly accepted open content license "Open Publication Licence". These newly established concepts are built on the term "Learning Object", first popularized by Wayne Hogins, which he defines as "small instruction components that can be reused in a number of different learning contexts"[13]. The establishment of *Creative Commons* in 2001 as a manner of defining an entire platform of copyrights that enable and facilitate content-sharing, and the MIT initiative "OpenCourseWare (OCW)" for free Internet access to most of their manuals paved and enhanced the OER movement. In 2005, the OCW model was adopted and

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[7] For more information see OECD, 2007: pg. 4-5.

[8] Ibid, pg. 4.

[9] In the referenced literature these digital materials are also known under the term "Learning Objects".

[10] http://davidwiley.org/

[11] Wiley, D. (1998), "Open Content".

[12] In English: open source software movement.

[13] "small (relative to the size of an entire course) instructional components that can be reused a number of times in different learning contexts", D'Antoni and Savage, 2009, pg. 21.

replicated by a growing number of institutions, whose number in 2008 accounted for more than 180 members worldwide, all dedicated to OER and included 4.000 manuals and courses. The University of Texas' project "The Connections" is also quite developed and expanded[14].

3.3. The term OER was first used in 2002 at the UNESCO[15] conference, where OER were conceptualized as "open access to educational resources, supported by Information and Communication Technologies, for non-commercial consultative, applicative and adaptive goals"[16]. In more conventional terms, today OER mean "digitalized materials offered for open use by teaching staff, students and self-thought individuals or groups, for the purpose of teaching, learning and research[17]". UNESCO, by means of its disbursed network of offices and projects, is dedicated to further development of the so-called *OER community*.

3.4. On the European continent, the European Union (EU) plays the main role in this process, notably by means of its project OLCOS[18] (Open eLearning Content Observatory Services), which is part of the EU e-Learning Program. This project aims to "create an information on-line centre that would promote, create and use OER concepts, in particular *open digital educational contents (ODEC)*[19] (Poposki 2010: 5-6)[20].

3.5. In typology terms, OER include:
- **educational contents**: curricula, courses, teaching digital contents, ranging from textbooks, manuals, workbooks, teaching plans, modules, tests, video materials to inventories/collected works, journals, and like;
- **educational digital databases** (the so-called learning objects);
- **education tools**: these include software to support the development, use, preparation of educational contents, as well as tools aimed to generate contents and create on-line communities in the field of education;
- **copyrights:** creation of copyright licenses that would promote open publication of educational materials;
- **open and free courses and training**.

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[14] According to D'Antoni and Savage, 2009, pg. 10-11: "*The Connections project of Rice University in Texas has two components. The Content Commons component offers collaboratively developed material that can be modified for any purpose. The second component comprises FOSS tools to help students, instructors and authors manage the information available in the Content Commons. Faculty from all over the world are contributing to and using the materials in the Content Commons, especially in the areas of engineering and music education*".

[15] UNESCO's 2002 "Forum on the Impact of Open Courseware for Higher Education in Developing Countries".

[16] Johnstone, S. (2005).

[17] OECD, 2007: 31.

[18] http://www.olcos.org/cms/upload/docs/olcos_roadmap.pdf

[19] Open Digital Educational Content (ODEC).

[20] The project is implemented by a consortium comprised of 6 institutions from 5 European countries: Fernuniversitaet in Hagen, Germany; European Centre for Media Competence, Germany; European Distance and E-Learning Network, Hungary; Mediamaisteri Group, Finland; Open University of Catalonia, Spain; Salzburg Research Forschungsgesellschaft, Austria.
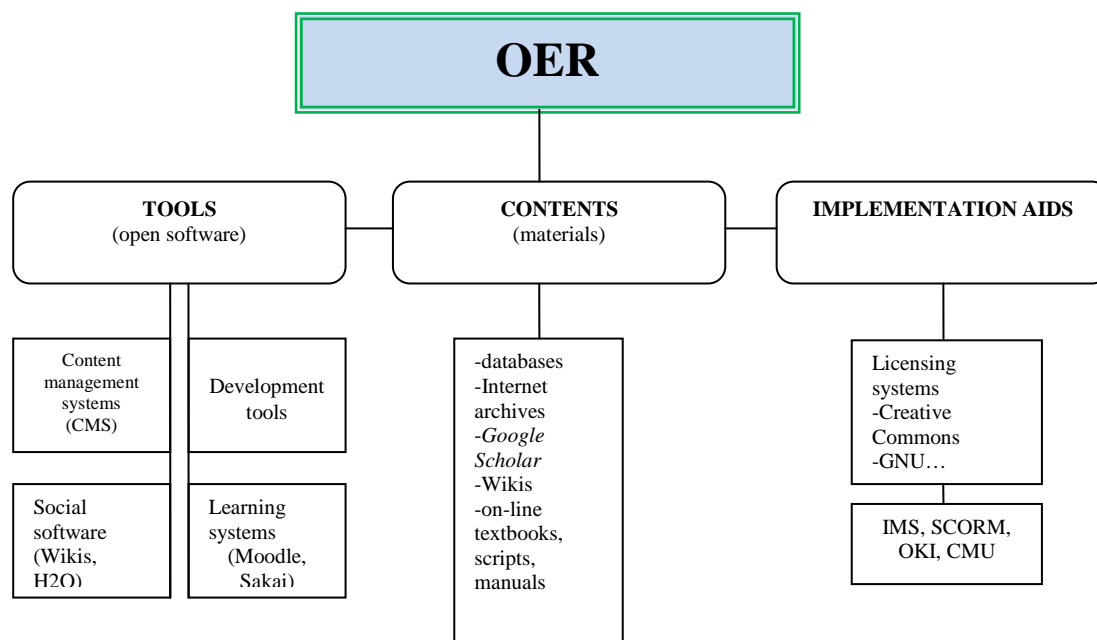
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                          │        OER           │
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        ┌───────────────────┐  ┌──────────────┐  ┌──────────────────────┐
        │      TOOLS        │  │   CONTENTS   │  │ IMPLEMENTATION AIDS  │
        │  (open software)  │  │  (materials) │  │                      │
        └───────────────────┘  └──────────────┘  └──────────────────────┘
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TOOLS (open software)		CONTENTS (materials)	IMPLEMENTATION AIDS
Content management systems (CMS)	Development tools	-databases -Internet archives -*Google Scholar* -Wikis -on-line textbooks, scripts, manuals	Licensing systems -Creative Commons -GNU…
Social software (Wikis, H2O)	Learning systems (Moodle, Sakai)		IMS, SCORM, OKI, CMU

Table 1: Concept overview of OER

Source: Margulies 2005.

3.6. As for the precise definition of "openness" and its use, one should note that it primarily refers to the categories: (a) access to; and (b) availability of educational materials and tools for users. Only under conditions of easy access thereto one can discuss OER, i.e., their easy and uninterrupted use in education. As part of such openness there are instances of available OER that cannot be applied in education, unless they are made available in a language understandable for potential users or there is lack of additional, complementary or ancillary OER that would enable efficient use thereof. Openness must imply non-restrictiveness or non-discrimination as regards OER use in education and their adjustment for free use and sharing[21].

3.7. Precise definition of OER must note that the education process - as analysed in this document – includes formal education, both public and private, scientific and research work and informal education. The emphasis was put on the resources, their scope, quality and availability, whereas the segmentation of their further use, education levels and different forms are subordinated to these findings. For the purpose of adjusting the conceptual framework of the research subject, in the case of the education system in the Republic of Macedonia, OER were defined as follows: "OER are public resources for teaching, learning and research, available under copyright licenses that enable free use by other persons"[22].

3.8. For illustration purposes and in terms of clear overview of the development process, one must stress several underlying trends in the field of OER[23]:

a.   Most universities worldwide that are dedicated to the OER project usually start "from zero" and the relevant projects are implemented by the teaching staff and not by the

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[21]   In non-commercial terms.
[22]   According to the model promoted by *Rossini,* 2010, pg. 18.
[23]   According to http://www.hewlett.org/uploads/files/HistoryofOER.pdf

administration (both state and university). There are also examples where students have initiated and enhanced OER projects[24].

b. Most OER projects are prone to the use of copyright licenses *Creative Commons* (http://creativecommons.org/) or *GNU Freed Documentation* (http://www.gnu.org/licenses/fdl.html), while the *Attribution-NonCommerical-ShareAlike*[25] option is the most frequently used license.

c. Serious efforts were made to replicate and apply OER projects in the countries where Internet connections are slow, expensive or inconsistent[26]. One such effort is the so-called *eGranary* with around 40 partners in Bangladesh, Gambia, Ghana, Guinea, Indonesia, Kenya, Uganda, and others.

d. The open source software *eduCommons*[27] was marked by a strong development and is adjusted to include generation of "OpenCourseWare" contents.

e. Different technologies of the type podcasting, videocasting and screencasting became a popular and cheap way for content collection and distribution[28].

f. The methods of folksonomy[29] and tagging have been increasingly used and facilitate the creation of metadata, indexing and linking thereof.

3.9. According to D'Antoni and Savage (2009: 10-11) following are the most prominent and remarkable OER project:

- *Wikipedia*[30]: on-line encyclopaedia whose contents are generated by the users and the community established around the Wikipedia project. Today it contains 3,480,463 articles and 22,254,758 pages[31];
- *EduTools*[32] of the *Hewlett Foundation* enables use of the software for management of courses and contents thereof, as well software tools for assessing the courses;
- *African Digital Library*[33];
- *Knowledge Commons*[34], whose contents are also available through *Golden Swamps*[35]
- *Open Content Alliance* [36] - cooperation group in the field of culture, technology, NGO activities and like, for the purpose of building a rich archive of multilingual digital texts and multimedia contents.

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[24] For example, the University of Hampshire, *http://dnstree.com/edu/hampshire/ocw*
[25] Among Creative Commons users, the Attribution-NonCommerical-ShareAlike option is the most popular.
[26] For more information visit eGranary at http://www.widernet.org/digitalLibrary
[27] http://educommons.sourceforge.net
[28] Compare, for example http://itunes.stanford.edu
[29] Folksonomy is defined as the system of tagging that originates from the collaborative creation and use of tags, for the purpose of classification and categorization of contents. The term is also known as social indexing, social classification or social tagging.
[30] www.wikipedia.org
[31] Data valid for November 2010.
[32] www.edutools.info
[33] http://www.africaeducation.org/adl/
[34] http://www.edclicks.com/
[35] http://www.goldenswamp.com/

3.10. On global level, OER development continues under the same dynamics; the number of archives and tools is increased and enriched, but this does not mean that all challenges and problems imposed by the global economy and Internet as metamedia[37] platform have been eliminated[38]. In summary, OER are "fundamental instrument that enables open education by means of cooperation and adaptability in the teaching and learning process[39]". The combination of infrastructural prerequisites, academic-scholar capacities and staff training, as well as institutional support are required for successful implementation of OER concepts and their incorporation in the education system[40].

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[36] http://www.opencontentalliance.org/

[37] http://komunikacii.net/02/24/defining-blog/

[38] For more information see the financial difficulties of Wikipedia (http://www.networkworld.com/community/node/11376, http://wikimediafoundation.org/w/index.php?title=WMFJA1/en&utm_source=20101119_JA007A_EN&utm_medium=sitenotice&utm_campaign=20101122JA006&referrer=http://en.wikipedia.org/wiki/File:Stages_of_education_in_Macedonia_en.svg), fight for *Net Neutrality* (http://www.savetheinternet.com/net-neutrality-101), etc.

[39] Rossini, pg. 19.

[40] Ibid, pg. 22.

4. EDUCATION AND ICT IN MACEDONIA

4.1. Primary[41] and secondary education[42] is compulsory in the Republic of Macedonia. Compulsory primary education lasts nine years and is organized in three education and upbringing periods as follows: first to third grade, fourth to sixth grade and seventh to ninth grade. The legislative changes from April 2007 made the secondary education compulsory, while it is organized as 3-year or 4-year education depending on the curriculum applicable and vocational profiles. *Citizens of the Republic of Macedonia[43] have the right to education at higher education institutions in the Republic of Macedonia under equal terms and conditions[44]*. Higher education is delivered at state and private universities established in the country[45]. The Macedonian legislation on education is in compliance with UNESCO declarations and its *"Education for All" Program* adopted on the World Education Forum in 2000, which includes the following goal: *"free and compulsory education with good quality for all by 2015"*.

> *According to the UNESCO Report from 1951, "the principle of universal compulsory education is no longer questionable" and is now considered as one of the major achievements of humanity: "the practice of compulsory schooling has been affirmed and consensually supported by the public with the claim that it is of best interest for the children...but it should be mentioned that guaranteeing the right to education should be accompanied with the obligation of the state to secure its implementation and use, as the highest civilization achievement..."[46]*

The Ministry of Education and Science (hereinafter: MES) is competent for matters in the field of: education and upbringing of all forms and at all levels; adult education; organization, financing, developing and advancing upbringing, education and science; education and upbringing of children with special needs and education and upbringing of children whose parents are expatriates with temporary work and residence abroad; recognition of vocational professions and education profiles; care for pupils and students' standards; technology development; information

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[41] Article 1 from the Law on Primary Education, "Official Gazette of the Republic of Macedonia" no. 103 from 19.08.2008.

[42] Law on Amending the Law on Secondary Education, "Official Gazette of the Republic of Macedonia" no. 49 from 18.04.2007: in the Law on Secondary Education ("Official Gazette of the Republic of Macedonia" no. 44/95, 24/96, 34/96, 35/97, 82/99, 29/2002, 40/2003, 42/2003, 67/2004, 55/2005, 113/2005, 35/2006 and 30/2007), Article 3, paragraph 1 shall be changes and shall read as follows: "Secondary education shall be compulsory for all citizens, under equal terms and conditions stipulated with the present law. After paragraph 1, new paragraph 2 shall be added and shall read: "Secondary education at all public secondary schools shall be tuition-free."; paragraph 2 shall become paragraph 3.

[43] Right to higher education is also guaranteed for persons without citizenship, under terms and conditions stipulated by law and by ratified international treaties, Article 7, Law on High Education.

[44] Article 7 from the Law on High Education.

[45] Children with foreign citizenship or children without citizenship with residence in the Republic of Macedonia have the right to primary education under equal terms and conditions as stipulated for children who are citizens of the Republic of Macedonia, Law on Primary Education, Article 8.

[46] Needs assessment for compulsory secondary education, http://www.pravo.org.mk/documentDetail.php?id=1895.

and technology culture; information system; international scientific and technology cooperation; supervision of matters falling under its competences and other matters as stipulated by law[47].

BASIC DATA IN EDUCATION

	1998/99	2002/2003	2008/2009
Primary education			
Number of primary schools[1)]	1 100	1 074	1 052
Students in primary education	259 081	239 334	217 685
Female	124 698	115 705	105 014
Male	134 383	123 629	112 671
Number of teachers	13 819	13 894	16 249
Female	7 596	8 028	10 324
Male	6 223	5 866	5 925
Secondary education			
Number of secondary schools[2)]	100	101	114
Students in secondary education	89 040	95 950	94 387
Female	42 648	45 912	44 676
Male	46 392	50 038	49 711
Number of teachers	5 477	5 877	6 720
Female	2 924	3 206	3 883
Male	2 553	2 671	2 837
Higher education			
Enrolled students	35 141	45 624	…
Female	19 359	25 621	…
Male	15 782	20 003	…
Number of teachers[3)]	1 385	1 519	2 182
Female	415	523	805
Male	970	996	1 377

Table 2. Basic data in education[48].

The education legislation addresses the term "lifelong learning" and defines it as "form of continuous education throughout the life for the purpose of advancing, complementing, deepening and modernization of knowledge"[49], as well as "informal education" which implies "courses, summer and winter schools, in-service qualification programs and other forms of learning which are not part of higher education courses and for which no diplomas are issued"[50].

Education goals should be achieved through the process of "acquiring general and applicable knowledge required for the everyday life or further education"[51].

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[47] Source: Ministry of Education and Science.
[48] Data presented concern all types of primary and secondary schools.
[49] Article 2, item 9 from the Law on Higher Education.
[50] Article 2, item 16 from the Law on Higher Education.
[51] Article 3 from the Law on Primary Education, ibid.

Data from the State Statistical Office (hereinafter: SSO) indicate the trends and capacities of the education process in the Republic of Macedonia, both in terms of institutions and infrastructure and human resources.

4.2. The library system on the territory of the Republic of Macedonia has been designed in a way so as to enable free and cheap access to education, literary and scholar materials, which – to a certain extent – facilitates the implementation of open education for the citizens. Library fund and contents is not free-of-charge, but leased for a period of time and subject to membership fee which usually accounts to several euros per year. The membership fee varies depending on the institution in question and the settlement where it is located, as well as on the library fund, services provided, number of literary units, etc. According to the State Statistical Office (SSO), this system has been marked by a decline in the last years, both in terms of number of libraries and number of library members (in the period from 2001 to 2007 the number of library members has been reduced by 20,000). Statistics also indicate negative trends as regards the use of these and similar "conventional" resources in education and related activities such as "lifelong learning" and "informal education". Also, worrying are the declining trends of printed issues (books or brochures):

LIBRARIES	2001[1)]	2004[2)]	2007[2)]
Number of libraries	92	85	72
Members (in thousands)	73	69	74
PUBLISHING	1998	2002	2008
Books and brochures			
Number of titles	738	1 102	658
Copies (in thousands)	2 101	1 899	697
Newspapers			
Number of titles	30	39	14
Copies (in thousands)	34 878	48 155	8 935
Magazines			
Number of titles	93	178	130
Copies (in thousands)	3 913	5 459	10 586

Table 3. Data from the State Statistical Office on the publishing activity in the Republic of Macedonia

In the school year 2008/2009, the number of students enrolled in primary education was by 16% lower, while the number of students enrolled in secondary schools was marked by an increase. At the beginning of the school year 2009/2010, the number of students in regular secondary schools accounted for 95 343, which provides an increase by 1.6% compared to the previous school year. In 2009/2010, the number of students enrolled in secondary education was by 6% higher compared to the 1998/1999 figures[52]. In the academic year 2008/2009, a total of 63 437 university students have been registered, which compared to 2007/2008 figures represents a decrease by 1.3%. The number

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[52] According to the State Statistical Office.

of female students enrolled accounts for 33 593 or 53% of the total number of university students. Most of university students or 81.6% are enrolled at state higher education institutions, while 18% of them are enrolled at private higher education institutions. According to MES, in 2010 the number of primary school students is 212 883, the number of secondary school students is 94 015, while the number of university students is 24 500. 2000 high school students are accommodated at dormitories, while 5 500 university students are accommodated at university dormitories. The budget of the Government financed 330 scientific and research projects in total.
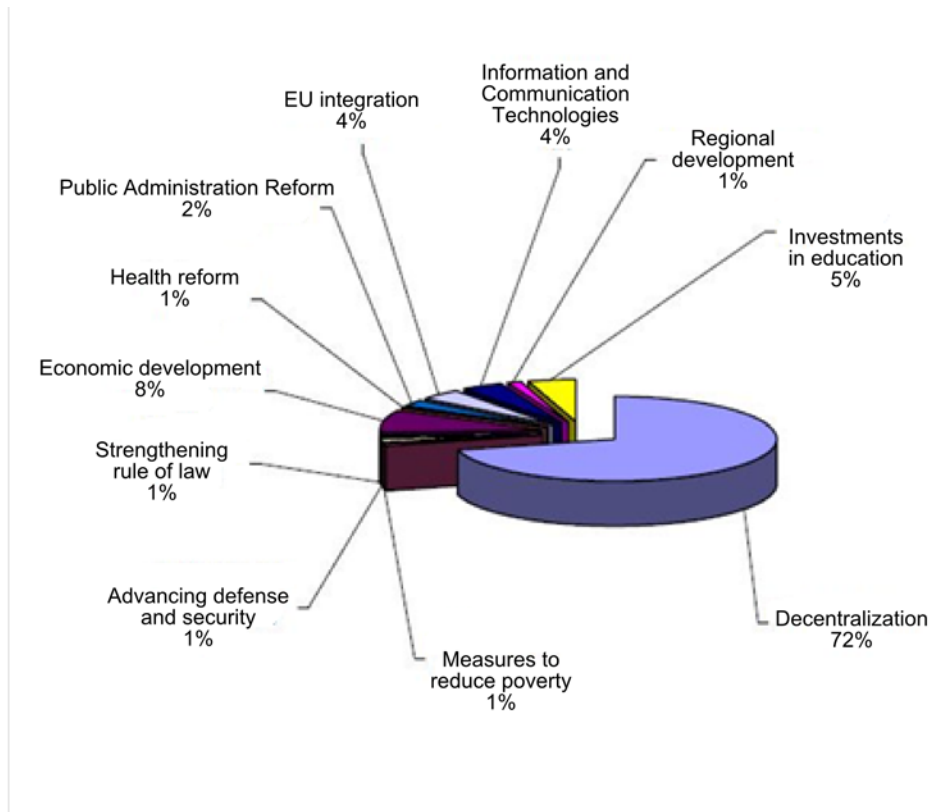

Figure 1. Disbursement of investments from the Budget of the Republic of Macedonia for the year 2010
Source: Ministry of Finance of the Republic of Macedonia

Total budget for education accounts for 840,007,000 MKD, while the budget of the Ministry of Education and Science for the year 2010 accounts for **19,575,964 MKD**. According to budget indicators, the number of employees in education accounts for 8565, whereas the operational expenditure per employee accounts for 811,000 MKD[53]. As part of the 2010 Budget, the Government of the Republic of Macedonia allocated **25 million MKD** to "finance programs of public scientific institutions and 20 million MKD to finance project applications submitted by state and private universities, separate faculties, public scientific institutions, independent researchers and centres of excellence[54]".

The Budget of the Republic of Macedonia allocates 600,000 MKD annually, or 1,200,000 MKD in total for two-year scientific projects. The open call for annual scientific and research activity of public scientific institutions awards 400,000 MKD per project. The Government of the

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[53] 2010 Budget of the Republic of Macedonia, page 69.
[54] Source: Ministry of Education and Science.

Republic of Macedonia funds the reconstruction of primary and secondary schools, as well as construction of new schools[55]. In particular, funds and activities in the education field are focused on: "construction of primary schools, reconstruction of primary schools, construction of primary school gyms, construction of secondary schools, reconstruction of secondary schools, construction of secondary school gyms, TI–reconstruction of high school student dormitories, construction and reconstruction of university dormitories". Moreover, the budget includes the subaccount T1 – program on modernization of primary education and the subaccount T2 – program on modernization of secondary education, as developed in the Project on Modernization of Education[56]. As part of this project, the MES defined the following priority activities:

> "*Securing quality and efficient education and upbringing in compliance with the European standards; further implementation of the primary two-year education and upbringing in compliance with the concept on nine-year primary education, the Law on Primary Education, as well as the drafted and adopted bylaws, and provision of free-of-charge textbooks for all student; complete coverage of children with primary and secondary education; increasing the quality of primary and secondary education; reducing the student drop-out from education and improving curricula and syllabuses; implementation of the decentralization process in education; further implementation of the Bologna Declaration and ECTS system; greater availability of higher education on the entire territory of the Republic of Macedonia by developing dispersed studies; implementation of higher education activity that includes undergraduate, Master and Ph.D. studies; improving the quality of services related to student accommodation at dormitories; continuity and transparency in the scholarship awarding process for high school and university students; developing the scientific and research activity, technology culture and technology development; improving equipment and conditions for instruction at schools and dormitories by means of construction and reconstruction and implementation of the Project "145 School Gyms"*[57]".

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[55] http://www.mon.gov.mk/index.php?option=com_content&view=category&layout=blog&id=54&Itemid=115, according to MES, the amounts from this part have not been specified as yet.

[56] This project is implemented and funded with the grant from the Government of the Kingdom of Netherlands, the loan from the World Bank and with budget funds secured by the Government of the Republic of Macedonia (according to the 2010 Budget of the Republic of Macedonia). This project includes three components: 1) improving the quality of education by improving school planning and management; training at schools and by means of the grant-awarding program for schools; 2) capacity building for decentralized education by means of advanced procedures on strategic planning, management, monitoring and accountability; and 3) project evaluation and management. This program aims to achieve school effectiveness, which is of key importance to improve the quality of education (ibid).

[57] According to the 2010 Budget of the Republic of Macedonia, page 69.

4.3. Series of reports and researches indicate the continuous increase of Internet accessibility and use throughout the country[58]. The number of people at the age of 15 to 74 years who used Internet in the first quarter of 2008 was increased by 41.3% compared to 2007 figures for the same period. The number of people who useed Internet from their homes was increased by 114.7% in the first quarter of 2008 compared to 2007 figures for the same period. The first quarter of 2010 marked an increase by 4.3 % as regards the share of households with Internet access compared to the same period in 2009. The share of households with broadband Internet in the total number of household was increased from 33.8% in 2009 to 37.2% in 2010. In the first quarter of 2010, 56.4% of the total population at the age of 15 to 74 years used computers, while 51.9% used Internet, which represents an increase by 1.9% compared to 2009 figures for the same period. Internet was most used by pupils and students, i.e., 93.8% of them are able to use Internet.

	Persons that used			
	computer		Internet	
	2009	2010	2009	2010
Computer/Internet users in the last 3 months Frequency in computer/Internet use in the last 3 months	100	100	100	100
every day	76.8	75.6	74.1	74.4
at least once a week	18.3	18.8	19.8	21.0
at least once a month	4.3	3.9	5.7	4.2
less than once a month	0.6	1.7	0.3	0.4
Place where computer/Internet was used in the last 3 months				
home	89.8	87.1	80.1	86.1
at work	22.6	25.8	19.7	22.6
at school, university	17.4	18.1	16.8	17.4
at other homes (relatives, friends)	21.2	19.1	18.6	16.8
other (for example, Internet cafe and other public venues	23.6	19.8	25.1	19.8

Table 4: Computer and Internet use in the first quarter of 2010 by people at the age of 15-74 years
Source: State Statistical Office

In 2009, 99.4% of public sector entities (both from central and local government) had Internet access. Most common is the Internet connection by means of DSL technologies (ADSL and other), as registered with 70.3% of public sector entities with access to fast Internet. SSO data indicate visible correlation and connection between the education level of people and their use of Internet:

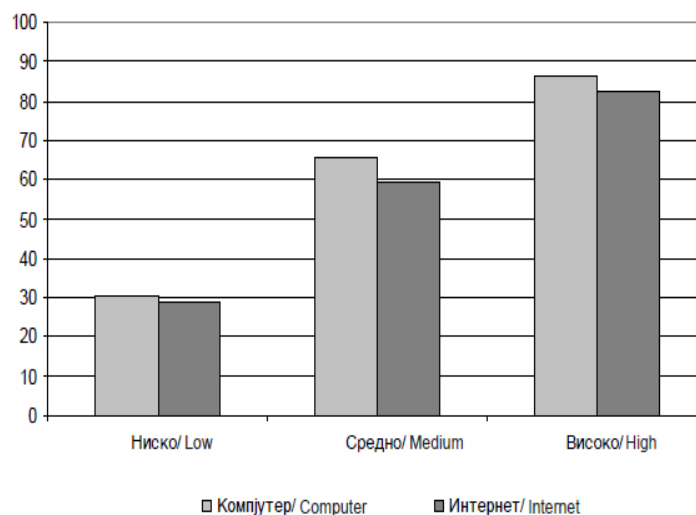[58] According to several sources as specified further in the text.

Table 5: Computer and Internet users at the age of 15-74 years per education level (%)

Source: State Statistical Office

As part of the education process "computerization and digitalization of education has been intensively developed in the period after 2002, when the first donation from China was received and enabled a certain degree of mass use of ICT at primary and secondary schools…....in 2005, the relevant institutions and expert working groups were established and started the implementation of the National Program on Education Development[59], the Draft Program on ICT Development in Education (2005-2015), the National Policy on Information Society and the National Strategy on Information Society Development[60] which encompass the process of computerization and digitalization of education"[61]. Although marked by variable results, obvious is that "the process of intensified and mass use[62] of ICT in education", which clearly paves the development of education in the Republic of Macedonia (for more see Zivanovik 2010: 03-15). The project "Computer for Every Child" of the Government of the Republic of Macedonia[63], implemented in coordination with the Ministry of Information Society (MIS) and Ministry of Education and Science (MES), anticipates the installation of 100 000 computers at all primary and secondary schools throughout the country in a period of 6 years, as well as provision of software tools for school subjects, acquisition of ICT skills, interactive on-line teaching and interactive teaching and assessment methods.

As given in the introduction, open remains the issue of planned and continuous alignment of ICT components with staff training, as well as ICT creative use, although the production of digital contents[64] depends on this process. Nevertheless, the entire process of OER implementation is

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[59] http://www.npro.edu.mk/dokumenti/strategija-mk.pdf
[60] http://www.mio.gov.mk/files/pdf/dokumenti/Strategija_i_Akcionen_Plan.pdf
[61] Zivanovik 2010, pg. 3.
[62] Ibid.
[63] Implementation period: 2006-2012, according to MIS data.
[64] According to Zivanovik, 2001: pg 5.: "Greater criticism appears as regards other aspects of the project, such as the technical and pedagogical ability of teachers to creatively use ICTs in their instruction, development and production of digital contents and localization of additional educational applications appropriate for the curricula".

impossible without the relevant infrastructure in place because projects that target infrastructure progress open possibilities for adherent use of OER.

Compared to basic data in education, noticeable is the current growth in the use of all resources in education, from human to technology, which inevitably leads to the need for intensified development of OER as a precondition for continuous development of education as a whole and its adjustment to the remaining societal conditions and factors.

4.4. It has been perceived that the state of affairs related to copyrights in the Republic of Macedonia[65] is unfavourable as concerns the adherent application of OER concepts. In Macedonia, educational materials, textbooks, manuals, research, scientific publications and like are almost always published under fully protected copyrights and intellectual property rights. Printing and distribution thereof are subject to same regulations that govern commercial products, whereas multiplication has been stipulated in detail with the view of protecting author's copyrights: "*the law allows natural persons to make maximum three copies of an authored work for private use, for direct and indirect non-commercial purposes*"[66]. Moreover, the relevant legislation stipulates other terms and conditions for limited reproduction of such contents:

- *non-commercial reproduction of authored works in maximum three copies is allowed in the following cases:*
- *for scientific purposes, in scope justified by the purpose of use; and*
- *for use by disabled persons, provided that the use in question is directly related to their special needs*[67].

In addition to the system and regulation in place, use of scientific materials in Macedonia has registered a series of cases and experiences[68] which indicate that there is no free circulation of educational and scientific resources and that they are often used as an instrument for corruption in education, notably by means of various methods on forced use or purchase, as well as unregulated sales. The education system is still void of measures and rulebooks that would regulate the process of sales/purchase of books written by teachers and other teaching staff[69], while free access to educational materials and tools has been reduced to declared commitments.

"*It is legally allowed to reproduce textbooks, reading books and other publications of similar nature, authored works as a whole or parts thereof in the case of short authored works or works in the field of photography, arts and*

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[65] Regulated under the Law on Copyrights and Related Rights, "Official Gazette of the Republic of Macedonia" no. 23/05 from 12.04.2005.
[66] Article 42 from the Law on Copyrights and Related Rights.
[67] Ibid, Article 46.
[68] According to the survey carried by the Foundation Open Society Institute – Macedonia (FOSIM) and targeting university students, the higher education system in Macedonia is highly corrupted, but unfortunately no such case has been sanctioned by means of a court decision.
[69] Although students pay their tuition, they are not entitled to free-of-charge student magazines.

applied arts, architecture, design and cartography, exclusively for non-commercial illustration purposes in the instruction process"[70].

In this context, it is legally allowed "to reproduce as a whole articles in daily or periodical newspapers, as well as comments on broadcasting programmes that address issues of general interest in the field of economy, politics, religion, arts, science and like, except in cases when the right to such use has been explicitly reserved by the author"[71]. The rigid regulation in this sphere fully ignores the instance of "double payment" for educational materials and resources imposed to the citizens. Notably, these materials are initially funded with taxpayers' money, but are later subject to purchase fees imposed by the publishers thereof. From the aspect of citizens' income and financial possibilities, it can be noted that educational tools and materials are far from being cheap, which largely reduces their affordability. This system comprised of variables that are not harmonized and well-designed is conductive to activities from the so-called "grey area", such as for example the tolerance for prohibited replication of educational materials, most common among university students.

One of the projects implemented in the Republic of Macedonia and aimed to address gaps identified in regard to free use of educational contents and tools is the Government's project "Free Textbooks"[72]. As part of this project, by November 2010 around 1 billion MKD were spent on printing almost 4 million textbooks. The project started in the school year 2009/2010 and continues in the school year 2010/2011. A similar project is implemented on higher education level, as well as for the benefit of research activities, and includes the translation of 500 renowned contemporary scientific and other works into Macedonian language, which at the moment is in the final stage of implementation.

4.5. Finally, another important factor that determines the need for OER and their implementation is the poverty rate in societies where OER are applied. Countries with high poverty rate are marked by an urgent need for OER development and application, primarily due to the fact that OER stimulate development and mitigate social differences, but also provide equal opportunities for life sustaining and social prosperity. "Access to knowledge is crucial for innovations, and innovations are crucial for development"[73]. According to SSO data, in 2009 the share of poor people in the Republic of Macedonia accounted for 31.1%. According to the same source, most vulnerable groups are the households with high number of household members, or 53.7% of poor people live in households with 5 and more members. The education level of the head of the household also affects the number of poor people, notably 56.7% of poor people live in

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[70] Subchapter 1, Article 40 from the Law on Copyrights and Related Rights.
[71] Ibid.
[72] The Minister of Education, Nikola Todorov: "this project has a noble goal: to assist students and their parents and to stimulate the education process. This is financial assistance. We are achieving the dream for equal access to education, so that everybody will have equal opportunities." ,September 2010
[73] Rossini, pg. 23.

households where the head of the household has no education or has completed only primary education.

Релативна сиромаштија според образованието на главата на домакинството, 2007-2009
Relative poverty by the education of household head, 2007-2009

70% од медијалните еквивалентни трошоци · 70% of median equivalent expenditures

	2007			2008			2009			
	Вкупен збирен индекс Head Count Index	Индекс на длабочина на сиромаштијата Poverty Gap Index	Структура на сиромаш-ните Composition of Poor	Вкупен збирен индекс Head Count Index	Индекс на длабочина на сиро-маштијата Poverty Gap Index	Структура на сиромаш-ните Composition of Poor	Вкупен збирен индекс Head Count Index	Индекс на длабочина на сиро-маштијата Poverty Gap Index	Структура на сиромаш-ните Composition of Poor	
Вкупно	29.4	9.7	100.0	28.7	9.2	100.0	31.1	10.1	100.0	Total
Без образование	53.7	23.5	6.7	53.2	19.4	4.3	54.2	22.7	2.7	Without education
Незавршено основно	37.7	13.3	16.1	39.1	14.6	15.8	43.4	14.3	14.7	Uncompleted primary
Основно	37.4	12.7	41.5	35.4	11.6	36.5	42.6	14.3	39.3	Primary
Средно	23.6	7.0	31.5	23.4	6.8	36.8	25.7	8.0	38.4	Secondary
Више	17.4	5.1	2.1	21.5	5.8	3.2	13.0	3.5	1.7	Higher
Високо	11.0	3.1	2.1	13.8	4.8	3.4	11.7	3.5	3.2	University

Table 6. Poverty rate according to the education level of the head of the household

In conclusion, reference can be made to Rossini's findings[74]: "open systems are a better model on the use of funds, since they enable better use, reuse and adaptation of recourses for the purpose of addressing inequalities", both in geographic and social terms[75].

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[74] Page 29.
[75] Author's note.

5. OER ANALYSIS AND STATUS IN MACEDONIA

5.1. Prior to considering the state of affairs as regards OER in the Republic of Macedonia, it is useful to determine the term "open access" (hereinafter: OA) as closely related to OER. "Open access materials are digital and on-line materials that can be used free-of-charge and free from restrictions as regards the copyrights and individual property rights"[76]. OA is a result of combining the effects of Internet on the education and the open source software movement. In essence, OA advocates easy and free access to scientific and educational works published on the Internet and is promoted as an efficient "model for knowledge distribution"[77]. In practice, OA implies on-line availability of scientific and educational articles from various inventories/collected works, journals and other forms of published contents[78]. Users can freely download, read, copy, print, distribute, search, link, etc.[79]. It is certain that OA complements projects on public libraries where people can join and use their archives. Therefore OA bridges the geographic gaps or limitations, and makes contents available free-of-charge. OA also indicates the problems related to the "digital gap" and the regions where open access is prevented due to poor development of ICT.

5.2. The Government's project "**Free Textbooks**" attempts to operate in line with OA. Project goals and implementation are stipulated in Articles 24 and 25 from the Law on Primary and Secondary Education Textbooks[80]:

ARTICLE 24

(1) *At the beginning of the school year, every student shall obtain a set of free textbooks.*

(2) *Teachers shall be obliged to instruct both, the students and parents that textbooks must not be damaged and that certain textbook passages must not be underlined or otherwise highlighted.*

ARTICLE 25

(1) *At the end of the school year, the student shall be obliged to return the set of textbooks undamaged, with the exception of school aids (workbooks, exercise books and like).*

(2) *Students who were referred to correction exam, shall return the textbooks set after the end of the school year, with the exception of school aids (workbooks, exercise books and like).*

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[76] Suber 2007 as quoted in Poposki 2010, pg.12.
[77] According to Rossini, pg. 23.
[78] Ibid. pg.24.
[79] The term "Meta-Data Harvesting" is also used.
[80] Law on Primary and Secondary Education Textbooks, "Official Gazette of the Republic of Macedonia" no. 98 from 04.08.2008.

(3) Should the student fail to return the textbooks or returns them damaged, the student's parent or guardian shall reimburse the value of the textbook(s), i.e., shall be liable to payment of 70% from the textbook's catalogue value.

(4) Every school shall be obliged to establish textbook fund.

(5) The school's principal shall be responsible for the textbook fund.

(6) The school's principal, class head-teachers, teachers and librarians shall be responsible for receiving, storing, distributing and returning sets of textbooks.

By November 2010, around 1 billion MKD was spent for printing almost 4 million textbooks[81]. Market price of the set of primary education textbooks is estimated at 2,100 MKD (around 35 EUR), whereas the price of secondary school textbook sets varies depending on the number of subjects and required textbooks. This project started in the school year 2009/2010 and continues with the same dynamics in the school year 2010/2011. The project targets all primary and secondary schools students, i.e., textbooks in Macedonian, Albanian, Turkish and Serbian languages intended for 312,072 students. It has been anticipated that textbooks will be used for at least three years, while the workbooks accompanying them will be distributed every year. In the case of damaged textbooks, students must settle the relevant reimbursement for damages caused[82]. Nevertheless, the project implementation was accompanied with different problems, such as untimely distribution of textbooks, insufficient number of textbooks, disputes as regards the payment of author royalties and like. The project's scope, as well as the scope of human, financial and material resources at all stages of project implementation proved to be a rather complex endeavour. The expert public and media pointed to a series of examples as regards the technical shortfalls and textbooks' erroneous contents. Problems are mainly of technical nature and can be amended by improving the project's organizational aspects. The distinction between free use of textbooks and damaging thereof is rather vague, hence in practice students and their parents often resort to textbook copying so that students can freely write on them or mark paragraph therein[83]. In terms of the "open education" concepts as articulated by OER and OA, the project's key shortcomings are more serious. Open access to these contents has not been reconsidered by the relevant institutions. In the aftermath of copyrights-related problems as regards the textbooks for 4th and 7th grade in primary education, the Ministry of Education and Science[84] temporarily published

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[81] Data from the Ministry of Education and Science.

[82] Macedonian media covered a series of parents' statements, who complained on the high amount for reimbursement of damaged free textbooks, http://www.novamakedonija.com.mk/NewsDetal.asp?vest=430101020137&id=9&prilog=0&setIzdanie=21972 (accessed on 15 November 2010).

[83] "Recently, I have stated that textbooks can be used. On that occasion, I announced that we are going to propose amendments to the Law on Textbooks, and thereby enable textbooks with interactive contents that will not be subject to the return policy." – Nikola Todorov, MES, for Nova Makedonija, 30 April 2010.

[84] http://mon.gov.mk/index.php?option=com_content&view=article&id=307:2009-09-18-14-11-04&catid=67:novostimon&Itemid=128

e-textbooks for downloading[85]. After the technical difficulties related thereto, downloading was discontinued and the process was closed to the already established framework of users. Educational materials and contents remained available for free use only to students who participate in the education process, whereas due to calculations of publishers and the MES as regards the textbooks circulation and number of students, only limited number of printed copies have been made available for purchase at bookstores throughout the Republic of Macedonia. Evident is that this project's objectives are not in compliance with OA and OER objectives, although it has been declared that in conjunction they were to lead towards achieving the defined "open education". In the field of free textbooks, despite the fact that serious resources were invested in the development and distribution of textbooks, the activities taken under different projects are not harmonized and coordinated towards the attainment of the common goal: free textbooks for all students and facilitation of knowledge dissemination and education in a country where the poverty rate accounts for 30%.

5.3. On 21 April 2010, the Ministry of Information Society promoted the project on free e-textbooks and the relevant **website *e-ucebnici.mk*.** 58 textbooks in Macedonian, Albanian and Turkish languages have been uploaded on the website and their contents are subject to free overview and browsing[86]. Majority of e-textbooks uploaded are intended for 4th and 7th grade in primary education, and the MIS announced that in the future the website will be enriched with new contents[87]. "Electronic publications enable students at any time and place to master the learning contents in an innovative and interesting manner, while teachers – by using the information technology – can prepare and present them"[88]. As regards this project, the MES stated: "e-textbooks will not replace printed textbooks. The goal is to present textbooks also in electronic form, but the meaning of printed textbooks is much bigger... this only provides an additional possibility for quality learning". Textbooks can be downloaded in PDF. According to the MIS: "this service is still under construction and in future it is expected to become the main resource where large fund of e-textbooks can be accessed from one central location."

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[85]   http://vlada.mk/ucebnici (inactive link, accessed in November 2010).
[86]   Browsing is limited to textbook title and author name.
[87]   "The new project serves the purpose of improving the Macedonian education system, as well as to allow students to master the relevant material in a more modern and sophisticated manner. The Ministry of Information Society has processed and uploaded all textbooks available in electronic format (pdf) at the Ministry of Education and Science and thereby developed a super modern web portal where students, but also all citizens, can access them from any location throughout the world." Ivo Ivanovski, MIS, 30 April 2010.
[88]   Ministry of Information Society.

Figure: e-Textbooks for primary education

Source: e-ucebnici.mk

5.4. The website ***skoool.mk***[89] is a complementary project developed by the MIS and the Bureau for Development of Education (hereinafter: BDE), which is part of the network *skoool.com*[90]. The website provides tools and contents in the field of mathematics, physics, chemistry and biology. It includes interactive audio and video materials that can be applied in the instruction process and contribute to creative presentation of relevant lessons in these subjects. The contents offered target the said subjects in primary and secondary education, and are closely related to the official curricula for these subjects. The website offers concise notes for users in the field of mathematics and natural sciences.

Figure. Source: skoool.mk

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[89] http://skoool.mk/
[90] http://skoool.com/

5.5. New media and the so-called *Web 2.0* open broad space for creative use of digital tools and free services and resources. In this context, one can notice the enhanced use of these means for innovations and creative approach in the education in Macedonia. Teachers with certain computer literacy more frequently utilize the possibilities offered by the Internet and new media. For illustration purposes, following are some mini-projects of this type implemented as individual or group efforts:

5.5.1. **e-uciliste**[91] is on-line collection of education courses in several subjects: IT, physics, chemistry, electrical engineering, digital systems, HTML, etc. This collection of resources is based on the *Moodle*[92] concepts. *Moodle* is a course management system (CMS), also known as "Learning Management System – LMS", or "Virtual Learning Environment – VLE". It is a free web-based application that is open and free for use, for the purpose of developing educational contents as part of education websites. Joining this system and obtaining a user account is open and free. The website contains guidelines and mini-courses on website and quiz design, protection thereof, creating video lessons, and other useful elements and information. *e-uciliste* has around 800 registered users. The *Moodle* platform proved to be convenient for developing educational contents and courses, but its potential remains underutilized in Macedonia. e-pedagog[93] is a related project, anticipated as a platform for exchange of experiences and e-materials in the field of pedagogy[94].

The creator of **e-uciliste** also created the **e-dnevnik** (electronic gradebook) implemented at the secondary school "Riste Risteski – Ricko" in Prilep. The *e-dnevnik* enables parents to have insight in their children's grades throughout the school year[95]. *forum.e-uciliste* operates as part of this project, and aims to exchange opinions and discussions, while *e-uciliste* enables external assessment. According to the creator, "the forum aims to grow into a forum for all secondary schools in Prilep, and then in Macedonia". The projects are licensed under *Creative Commons*, under the Attribute-Share Alike license.

5.5.2. Textbooks in the subjects "IT" and "IT projects" at the primary school "Straso Pindzur" in Negotino illustrate an education project hosted on the **Wiki platform**[96]. This project includes free electronic textbooks that can be downloaded and used, information for students and

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[91] http://www.e-uciliste.com/, administered by professor Vlatko Butleski, interview for it.com.mk: http://it.com.mk/da-go-napravime-uchilishteto-podobro-mesto-za-uchenje-2/#ixzz16WJSfO70

[92] http://moodle.org/,

[93] http://e-pedagog.com

[94] http://e-pedagog.com/index.php?option=com_content&view=section&layout=blog&id=4&Itemid=19

[95] "At all times, parents can use the electronic gradebook to monitor their children's grades and class absence. The system is fully protected. A unique password is required for any students, and passwords are given to parents only. There are no other ways to access these records. Electronic gradebooks are a unique project in Macedonia that provides excellent results. On the development of this project, I worked with Vasil Zidrovski, former student and currently IT student at the university in Bitola, and Valentin Ambaroski, who was tasked with the web design. Daniel Daskaloski assisted by hosting the website for the project duration. In addition to parents, the project is also beneficial for administrators, pedagogues, principles, accountants, who all have access to different data for their relevant analyses". Vlatko Butleski, 15 January 2010, *Nova Makedonija*.

[96] http://informatika-osnovno.wikispaces.com/

parents, coordination of activities, guidelines and manuals, etc. *Wikispaces* is one of the few quality possibilities for implementation of OER, which to a large extent can improve the work of teachers and can increase the quality of education as a whole. The project's creator uses resources from blogging platforms in order to interact with students and parents, but also in order to issue the school electronic bulletin[97] and therefore provides an example of efficient application of *Web 2.0* tools in education. Projects of this type continue to grow in number and are realized as part of teachers and professors' activities, but in a decentralized manner[98].

5.6. The **Bureau for Development of Education** (hereinafter: BDE) is an institution within the Ministry of Education and Science, seated in Skopje and comprised of 11 organization units throughout Macedonia. BDE is competent for development and advancement of education and upbringing in the Republic of Macedonia. Competences of the BDE include: preschool, primary, secondary, VET and post-secondary education and upbringing, education for children with special needs, adult education, dormitories, and lessons in Macedonian language and culture targeting children and citizens of the Republic of Macedonia who live abroad. The Bureau also performs activities for the purpose of development of OER concepts.

5.6.1. As for the coordinated activities of the MES, the BDE and the MIS, one should indicate the transfer from *Windows* OS (operating system) to *LINUX-Edubuntu*, which is free and open OS.

> *"In the school year 2008/2009[99], the Ministry of Education and the Bureau for Development of Education initiated the selection, translation and localization of educational Edubuntu tools as part of the Project on Primary Education. According to the MIS, the use of this open-code OS will enable computerization and digitalization of instruction of the anticipated 30%, and the software tools will 'visually complement and enable practical application of lessons, which will continue to be delivered according to the relevant textbooks. The educational software package is comprised of Edubuntu OS and 43 educational tools in mathematics, chemistry, physics, geography, Latin language and IT and the office suite of Open Office tools"[100].*

The given project also included training for primary and secondary school teachers as regards the use of the operating system and its tools. In the period March-June 2009, the FON University and the Faculty of Mathematics and Natural Sciences[101] delivered training for 6300 professors. The training also included a component on website design and training manuals. In

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[97] http://strasopindzur.wordpress.com/, http://evesnik.wordpress.com/
[98] For example, http://geografija-bt.webs.com/
[99] Zivanovik, pg. 13-14.
[100] Ministry of Information Society, March 2009.
[101] Contractors were selected by means of a tender, Hosman quoted in Zivanovik, pg. 14.

2010, the training for primary school teachers started, and is implemented in cooperation with *USAID's*[102] Project on Primary Education[103] (PPE). It includes "general training on *Edubuntu* software package, and training on *Edubuntu* integration into particular subjects, training on *ToolKID* program[104]". The *ToolKID* software was localized in 2005 and is the first educational software in Macedonia used in lower primary grades. Moreover, as part of OER efforts, the website **ToolBox**[105] was developed, and according to its creators represents "a collection of instruction materials for the 21st century". The website also hosts an e-archive comprised of specialized textual and video materials in the subjects: mathematics, chemistry, physics, biology, geography and technical education. Video materials are uploaded on the *YouTube* service where PPE hosts its own channel.[106]

Figure 2. ToolBox, PPE.

According to BDE, underway are activities that target promotion of the software application at all primary schools, accompanied with training for teachers as regards its efficient use. *Edubuntu* tools are also important for education development by means of ICT-related activities. As part of PPE, more than 40 *Edubuntu* software tools have been localized. These are technical software aids used in the subjects: mathematics, chemistry, geography, physics, IT and music education, and they are to serve the purpose of facilitated instruction and practice delivery[107]. According to the BDE,

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[102] *United States Agency for International Development.*
[103] http://www.pep.org.mk/
[104] Ibid.
[105] http://toolbox.pep.org.mk/
[106] http://www.youtube.com/user/usaidpep
[107] Details on these tools' performance are given in Lameva and Janakievska, 2008, and quoted in Zivanovik, 2010, pg. 16: "mathematics – program on percentage calculation, geometry and algebra software; chemistry – program on modelling 3D molecule presentations, application and visualization of chemical processes; geography – programs on

the publication "Manuals for 5th Grade Primary School Teachers" in Macedonian language has been developed. This issue will be published on the Bureau's website and will be printed in 1000 copies which will be distributed to schools free-of-charge.

5.6.2. Digitalization of educational contents is anticipated as part of the Government's project "Computer for Every Child[108]" implemented by the MIS and the MES at all public primary and secondary schools and stipulated under the National Program on Education Development 2005-2015. Digital instruction materials aim to:

- *stimulate students' interest in the subject;*
- *assist students to memorize facts from the curricula;*
- *facilitate comprehension of lessons;*
- *trigger desire for individual research.*

(MIS, 2010: 7)

According to the MIS, e-contents should be uploaded to a central location or server and can thus be downloaded from any location, either at or outside school premises. Implementation of the above listed projects is at different level of progress (in terms of technical aspects or contents).

The Government of the Republic of Macedonia is in the procedure of announcing an open call for e-contents in six subjects from primary and secondary education, those being: history, geography, mathematics, physics, chemistry and biology, in four languages of instruction: Macedonian, Albanian, Turkish and Serbian. According to the MIS, it has been anticipated for the first stage of the project to target digitalization of 30 lessons in primary and 50 lessons in secondary education for all six subjects given above. According to the same source, this is only part of the overall plan and goal on "full digitalization of all subjects in education and development of e-contents adjusted to students' age group and to the relevant curriculum"[109].

5.6.3. As part of the *Intel* donation worth 15 million USD, as referred to under point 5.4., and by means of the website *skoool.mk*, the Government received four digitalized curricula (in mathematics, chemistry, physics and biology) and training for lower primary teachers (1st to 3rd grade) on work with *Classmate* laptops[110].

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learning geography, maps, flags, planetarium; physics – program on studying physical phenomena, animations in the field of physics; IT – program on typing, programming logos, *Gambas* programming tools; music education – program on learning music intervals, scales, tempos and individual exercises; other subjects: Latin language, international dictionary, virtual laboratory, electronic microscope, creating students' grade books, browsing websites, etc.

[108] The project "Computer for Every Child" is implemented in three stages: equipment purchase and installation, maintenance, local and Internet connections, and developing digital educational contents and training on instruction delivery by means of ICT targeting teachers (Ministry of Information Society, 2009). The project implementation started in January 2007 and it is anticipated to be completed by 2012. Ministry of Information Society.

[109] As Minister Ivanovski said: "new legislative amendments necessitate the digitalization of all textbooks and printed copies thereof will be distributed with CD-ROMs. All authors, in agreement with the Macedonian ICT company, will be obliged to develop e-contents and then apply on the open call announced by the Minister of Education and Science", Ivo Ivanovski, 21 January 2010.

[110] Ministry of Information Society, October 2010.

5.7. USAID is the partner of the MIS as regards the development of e-courses on *e-ucenje*[111], which is part of the project "e-Government"[112]. This e-course is free and open for all stakeholders. The project is in its early stage and for the time being there are no developed materials available. The course database[113] has been uploaded to the website of the first project on ICT in education "Portal for Primary and Secondary Schools[114]".

5.8. In conclusion for this overview on institutional activities in the field of OER, I would like to indicate the framework established for future processes and projects. The framework was anticipated under the *National Strategy on Development of e-Contents (NSDeC)* and the *Action Plan on Development of e-Contents for the period 2010-2015 (APDeC)*. According to these documents, the competent institutions should organize annual open calls on designing e-learning materials, for the purpose of supporting continuous development. Moreover, these strategies anticipate that "all materials developed should be made available and free for all users", including those outside the school system, given the fact that they are "developed by the public sector". In the first two years of projects' implementation "e-contents use should be monitored by means of annual analyses", and should include identification of tools needed to support developmental processes and enriching e-contents in education. Activities on developing tools and aids intended for individual content creation are planned to start in 2012[115]. Future activities mainly concern the establishment of expert groups tasked to develop plans, select subjects and contents, specify them, determine and verify them against the quality standards, develop the selection methodology for subjects and contents, evaluate activities and contents, etc. It has been anticipated that e-contents evaluation will be based on the following criteria: usability[116], accessibility, and scalability, possibilities for reuse, transferability, quality, reliability and performance. Training on e-contents use has also been anticipated for the teaching staff. As part of NSDeC, the MIS defines the concept of "digital citizenship" as the pillar for the development of following activities and goals: "students understand human, cultural and societal issues related to technology and abide the principles on legal and ethical behaviour. Students: (a) advocate for and practice safe, legal and responsible use of information and technology; (b) are positive as regards the use technology that stimulates cooperation, learning and productivity; (c) demonstrate personal responsibility for life-long learning; (d) are leaders in digital citizenship.

5.9. As regards *digital educational repositories*[117], the state of affairs in this field is in early development and activities in this field for the time being include digital catalogization and

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[111] http://www.ucenje.org.mk
[112] http://www.egov.org.mk
[113] http://courses.schools.edu.mk/pdf/index.html
[114] http://schools.edu.mk/
[115] MIS, National Strategy on e-Contents, pg. 5.
[116] In English: *usability*.
[117] In English: Digital Educational Repositories.

database, networking, but do not address access to contents. The project titled "Macedonian e-Libraries[118]" (MeL) was initiated on FOSIM's initiative from 1999[119] and is part of the activities taken by the National and University Library (hereinafter: NUL) "St. Clement of Ohrid" in Skopje. "MeL is a consortium of libraries and related institutions, which have joined efforts for the purpose of expanding their library activity from information-on-paper to digitalized services and information. This goal is pursued by means of coordinated purchase of e-resources for the consortium members and joint efforts aimed to improve the IT infrastructure in Macedonia and upgrade library services in the light of digital contents". MeL was conceptualized as an information-hosting website intended to be used for the purpose of research activities, notably by means of "free bibliographic, factographic, biographic, numerical and other information related to natural, applied, social and humanitarian arts and sciences". The consortium is comprised of 59 entities[120], mainly public libraries, institutes and includes one private education institution[121]. MeL offers browsing of foreign library funds by means of computer terminals located at its premises. MeL is also connected to EBSCO database, which enables access to a broadly distributed data network, i.e., databases, and mediates access to magazines, materials and contents, i.e., databanks, either in hard copy or electronic format, which implies subscription or pre-ordering.

NUL's activities also include "virtual library" implemented as part of the COBISS[122] Program, and represents an on-line catalogization of library funds. Information contained therein is of reference nature (author's name, work's title, publishing house, year of publication, abstracts, but available only for a portion of the library fund, and includes data on where browsed materials can be found in hard copy).

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[118] Available at http://w3.nubsk.edu.mk/

[119] "In 1999, together with other countries, Macedonia was the beneficiary of the Open Society Institute's initiative aimed to improve the stock of libraries by means of computer purchase and Internet access. With the grant awarded by the Foundation Open Society Institute – Macedonia, the Southeast European University in Tetovo benefited from the EBSCO subscription, as one of the few institutions that used this unique opportunity to access and use free electronic information. Two years later, statistics on the EBSCO utilization rate in Macedonia indicated that there is low interest for databases use in Macedonia. In March 2003, the Foundation Open Society Institute – Macedonia made efforts to present the eIFL project in front of the broader public, which included use of EBSCO and eIFL databases, while the Ministry of Culture took the initiative to establish a national consortium of –libraries and anticipated significant funds to support projects in the field of e-publishing and digital libraries. The general assembly of Directors at national libraries and related institutions that were part of NUL "St. Clement of Ohrid" was held on 17 April 2003, when the first consortium of e-libraries in Macedonia was established. The response to this initiative was amazing: 28 of the 33 libraries signed the Letter of Authority for the MeL Board", source: http://194.149.132.36/Index.php?drop_menu=5 .

[120] http://194.149.132.36/Index.php?drop_menu=6

[121] Southeast European University from Tetovo.

[122] http://www.vbm.mk/cobiss/cobiss_mk-en.htm

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Display format [User] [User-full] [Card] [COMARC] [Abbreviated]    holdings [H1] [H2]

                        (◀◀) (◀) (▶) (▶▶)

   TYPE OF MATERIAL....... : monograph, language materials, printed
   COUNTRY OF PUBLICATION . : Macedonia
   PUBLICATION YEAR....... : 1988
   LANG. OF TEXT/ORIG..... : Macedonian
   SCRIPT................. : Cyrillic - Macedonian
   FORM OF CONTENTS....... : textbook for colleges
   ILLUSTRATION CODES..... : no illustrations
   AUTHOR................. : Koneski, Metodija - author
   TITLE................. : Metodi za presmetka na proizvodstvoto vo
organizaciite na združen trud : [osnoven učebnik]
   EDITION STATEMENT....... : (2. izmeneto i dopolneto izd.)
   IMPRINT................ : Prilep [t.e.] Bitola : Univerzitet, 1988
   MANUFACTURER........... : Ohrid ("Kosta Abraševik")
   PHYSICAL DESCRIPTION.... : 356 str. ; 24 sm
   NOTES................. : 1. izd. 1978 // Tiraž 550 // Bibliografija:
str.351-354
   SUBJECT TERMS.......... : Trošoci - Presmetka -
Visokoškolski učebnici
   UDC................... : 657.47(075.8)
   COBISS.MK-ID........... : 51466

                        (◀◀) (◀) (▶) (▶▶)
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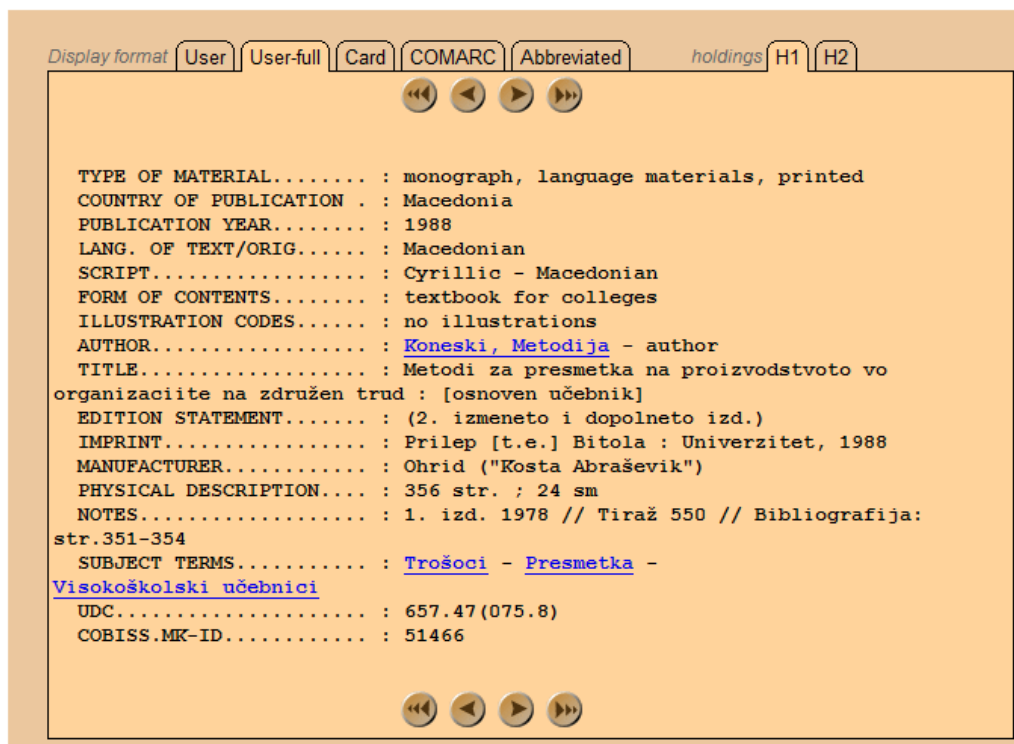
Figure 3. Sample from information available on library funds
as implemented by the COBISS Program

The list of members registered includes 44 libraries from Macedonia[123]. COBISS's local network is connected to the networks in Slovenia, Bulgaria, Serbia, Montenegro and Bosnia and Herzegovina, while the connection to Albanian networks is in its initial stage. NUL also implements the project "Digital Library", which at the time being is comprised of around 40 content units mainly from the field of Macedonia's cultural and historic heritage. The digital library focuses its activities on increasing this fund and expanding its scope of contents. It must be noted that under the current stage of networking and contents digitalization, these projects represent a form of terrain preparation for the actual introduction of OER and OA. Nevertheless, they are necessary developmental efforts and the scope and quality of future developmental stages heavily depends on their outcomes.

5.10. Other institutions and entities in the scientific and educational sphere in the Republic of Macedonia pursue different approaches towards publishing and open access to e-contents. Following institute have registered their relevant journals in the Directory of Open Access Journals (hereinafter: DOAJ): the Institute of Defectology[124] (at the University "Ss. Cyril and Methodius"), the Institute of Chemistry (at the University "Ss. Cyril and Methodius")[125] and the Faculty of Medicine[126] (at the University "Ss. Cyril and Methodius", the Institute for Sociological, Political and Judiciary Research[127] (at the University "Ss. Cyril and Methodius") and the Faculty of Tourism

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[123] http://vbmkhome.vbm.mk/mk/o_cobissu/libraries.asp
[124] http://jser.fzf.ukim.edu.mk/
[125] http://www.mjcce.org.mk/
[126] http://www.mjms.ukim.edu.mk/
[127] http://www.newbalkanpolitics.org.mk/

and Management[128] (private education institutions). The contents presented in these journals are rather modest. The Macedonian Academy of Arts and Science (MAAS[129]) does not have own database.

5.11. Other education entities apply the principle of public availability by means of other networks, as is the case with the Institute of Economics[130] at the University "Ss. Cyril and Methodius" which based its e-archive on the *D-Space*[131] model. The Institute of Economics' electronic archive, implemented in cooperation with the Foundation Metamorphosis[132], made Master and PhD Theses available to the broad public and included a series of projects implemented by the Institute[133]. The archive allows basic browsing per topic groups of works and authors. The Euro-Balkan Institute[134] has its own electronic archive comprised of newspaper clipping, which at the moment contains more than 300,000 printed articles stored, and its use is commercially based.[135]. The University "Goce Delcev" from Stip, as part of it website, includes a section entitled "Library" dedicated to scientific and educational on-line resources[136] with links to related foreign archives, but unfortunately the University failed to upload own materials and subject them to the same principles of use. The "University Journal"[137] published by the University "Ss. Cyril and Methodius" is available also as e-issue, but is of review character and holds no scientific value. The University "St. Clement of Ohrid" does not publish its publications on-line[138]. As for the other higher education institutions targeted with the present analysis, including those from the private sector, no on-line scientific and educational archives were identified. As for the private sector, two archives were identified, those being: *Bookbox*[139] and *Margina*[140].

5.12. Wiki contents[141], i.e., the open Internet encyclopaedia in Macedonian language[142] were marked by a modest increase in scope and variety[143]. At the moment, Wikipedia has 42563 articles and 23768 registered users. Wikipedia in Macedonian language is operational from 2003. The Macedonian local branch of the Wikimedia Foundation - "Wikimedia Macedonia" works on promotion and enriching its contents. On 21 September 2009, the branch was officially recognized as the Foundation's local branch by means of the consent issued by the Wikimedia Board of

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[128] http://www.utms.cc/e-student/index.php?option=com_content&view=article&id=29&Itemid=418
[129] http://www.manu.edu.mk/index.htm
[130] http://depo.ek-inst.ukim.edu.mk/jspui/handle/123456789/24
[131] http://www.dspace.org/
[132] http://metamorphosis.mk/mk/aktivnosti/1804-obuka-za-promocija-na-skladishteto-na-ekonomskiot-institut
[133] http://depo.ek-inst.ukim.edu.mk/jspui/community-list
[134] http://77.28.96.119/joomla/index.php?option=com_content&view=article&id=92&Itemid=56
[135] http://77.28.96.119/joomla/index.php?option=com_content&view=frontpage
[136] http://www.ugd.edu.mk/index.php?option=com_content&view=article&id=97&Itemid=95
[137] http://www.ukim.edu.mk/mk_content.php?meni=122&glavno=32
[138] http://www.ukim.edu.mk/mk_content.php?meni=122&glavno=32
[139] http://kupot.on.net.mk/
[140] http://www.okno.mk/node/7950
[141] http://mk.wikipedia.org
[142] For the purpose of the present analysis, only Wikipedia contents in Macedonian language were taken in consideration, as it is the official language on the entire territory of Republic of Macedonia.
[143] http://stats.wikimedia.org/EN/TablesWikipediaMK.htm

Trustees[144]. At present, Wikipedia's subdivisions (Wikidictionary, Wikibooks, Wikiquotes, etc.) in Macedonian language are poor in contents. In order to increase the number of articles and contents, the Ministry of Information Society initiated the implementation of the project aimed to increase the number of Macedonian contents on Wikipedia. According to the MIS, "in addition to the increased number of Macedonian contents on the Internet, the project also targets awareness-raising on new contents development". At the beginning of 2010, the project's working group was established and is comprised of representatives from the Faculties of Philology in the Republic of Macedonia and representatives from other Faculties and institutions. The Memorandum of Cooperation and Understanding was signed between the MIS and the Deans of Faculties involved, notably the Faculty of Philology "Blaze Koneski" at the University "Ss. Cyril and Methodius", the Faculty of Philology at the University "Goce Delcev" in Stip, the Faculty of Philology Sciences at the FON University, the Faculty of Foreign Languages at the American College – Skopje and the Faculty of Mathematics and Natural Sciences at the University "Ss. Cyril and Methodius" in Skopje. "The Faculties should work on encouraging their students to create greater number of Wikipedia articles, under the mentorship of the working group comprised of experts from the higher education institutions signatories to the Memorandum"[145].

5.13. In Macedonia, the open source software is characterized by a moderate developed in the last few years. As it was given above (item 5.6.1.), the open source software was marked by a major penetration in the education system in the Republic of Macedonia with the introduction of the *Edubuntu* OS and its software tools. Independently from this process, the open source software movement was intensified with the activities taken by Free Software Macedonia (FSM), a non-profit organization established in 2002 in Skopje and "dedicated to the promotion of free/open source software and awareness raising as regards the economic and socio-ethical context of the free software". FSM's activities are focused on: "(a) open source software on technical, technological and logistic level; (b) policy, social and ethical issues concerning Free Software". FSM is the principle organization responsible for "localization of Free Software in Macedonian, including OpenOffice.org, Mozilla products, as well as the GNOME and KDE desktop environments and other desktop applications. Moreover, the GNU/Linux OS has been adapted to use the Macedonian Cyrillic alphabet, dates, calendars and currency. Several GNU/Linux distributions, such as Ubuntu, Fedora, Red Hat, Mandriva have also been localized in Macedonian language as part of the FSM's activities[146]".

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[144] http://meta.wikimedia.org/wiki/Wikimedia_Macedonia
[145] Ministry of Information Society.
[146] http://slobodensoftver.org.mk/za_sloboden_softver_makedonija

6. CONCLUSIONS

6.1. The present analysis addressed the current state of affairs and status of OER in the Republic of Macedonia. It noted different levels of development as regards particular OER concepts and principles. The general assessment indicates the existence of initial activities, as well as more developed concepts on open education for all. OER application depends on the infrastructure available, although it has been gradually developed and promoted. Technological components are also an integral part of the development process, but in order to provide their contribution as needed, they should be coordinated with the remaining components that are precisely defined in OER.

Despite the several serious and ambitious projects and activities aimed to include the Republic of Macedonia among the countries where OER play a significant role in education, the general assessment indicates shortfalls as regards the coherent and coordinated activities and projects. Database networking and OA-related activities are implemented separately and in a non-coordinated manner. It has been noted that certain project activities are initiated although the previous stages in development have not been completed, notably in terms of technology, tools and contents. Public institutions, except for their projects, fail to focus their resources on stimulating private initiatives and collaboration, although they are considered of crucial importance in the light of increased activities that complement public projects. There are no pillars for development of activities that would contribute to the integration of separate project components. A coherent system needs to be developed and implemented in all OER-related fields: technology, software, program policies, contents, etc.

As is the case with most developing countries, Macedonia is also characterized by the model of double payment for educational contents, where initially educational contents are funded with taxpayers' money, and later charged by commercial entities that distribute educational contents and tools. This model should be abandoned and the education contents should operate separately from the commercial sector. The public institutions should be focused on service provision for citizens and educational and scientific entities, rather than supporting market-based activities of commercial entities.

The key problem, which is a major obstacle to achieving any progress in the field of OER are copyrights and related rights. It is of utmost importance that they are redefined, notably those that govern the education and scientific-research process.

Trends on users' preferences indicate the need for the so-called "OER on-line nodes", or web-services/websites that would enable easy access to open contents and tools. Under the current system in place, they are mainly scattered and disbursed and void of regulated search engine

optimization, both on foreign and in-country browsers. In Macedonia, such OER "nodes" should enable indexing, content links and accessibility.

Contents and number of different areas in the so-called "digital educational repositories" or "educational and scientific on-line archives" and related websites need to be enriched. In the period until the enactment of amendments to the relevant legislation aimed to eliminate restrictions as regards the publication of contents for scientific and non-commercial use, the activities should be focused on accumulation of contents that are not subject to distribution copyrights, as is the case with copyrights on works older than 70 years, documents of great cultural and national importance, etc. For the time being, mainstreaming and active support of contents publication under *Creative Commons* licenses is underutilized.

Status quo was noted as regards the availability of public scientific works. Again, copyrights-related problems are the reasons for the current state of affairs. These contents should be more easily accessible for education and scientific entities, whereas their scholar values should serve the purpose of facilitating education development. The strategy on enabling access to e-contents is yet to be developed, and for that purpose the models applied by other countries should be given due consideration.

As regards ICT literacy, it can be concluded that further development and training delivered to all stakeholders is needed. Training for and exchange of experiences among users need to be intensified. Training should address all OER-related activities (from technical to research) and should be adjusted to different groups of participants.

As regards free textbooks, evident is the gap between educational contents for lower and higher education levels. Such discrepancy should be eliminated and contents should be based on concepts that secure continuous development of education and scientific activities. For the purpose of catalogization, the existing connections among digital networks should be fully functional, while these models should also serve the purpose of completing networked systems with significant OA importance.

New media open many possibilities for use of digital tools and free services and resources. Their use is marked by a continuous increase, but unfortunately activities in this field are utterly fragmented in order to have any major effects on the education process as a whole. Teachers with certain computer literacy and knowledge more frequently utilize the possibilities offered by these services in their instruction delivery, but also in communicating with students' parents. This process can be supported and intensified with additional computer literacy training and exchange of experiences by means of different forms of associations or networking. Standardization of software tools is needed for the purpose of generating contents, courses, programmes and like. Failure to address this issue would result in a model of scattered activities, where energy and resources would be wasted on processes that are uncoordinated.

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8.   ABBREVIATIONS:

APDeC - Action Plan on Developing e-Contents for the period 2010-2015

BDE – Bureau for Development of Education

SSO – State Statistical Office

EC – European Commission

ECTS – European Credit Transfer System

EU – European Union

ICT – Information and Communication Technologies

MIS – Ministry of Information Society

MES – Ministry of Education and Science

NSDeC – National Strategy on Developing e-Contents

NUB – National and University Library

ODEC – Open Digital Educational Contents

OA – Open Access

ER – Educational Resources

OER – Open Educational Resources

PPE – Project on Primary Education

RM – Republic of Macedonia

9. ABOUT THE AUTHOR

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