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Υποστήριξη της ΑεξΑΕ μέσω αυτόματης εύρεσης και παρουσίασης ανοικτού εκπαιδευτικού υλικού ως παραλλήλων κειμένων κατά το μοντέλο Λιοναράκη

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A web-based tool supporting ODL courses with OER

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Abstract
The use of proper multimedia educational materials in education facilitates and advances the learner's personal way to the knowledge, a process which is fundamental in ODL. Today there is an evolution in the production of Open Educational Resources (OER), as well as, New Media appropriate for use in education. In this paper the properties the educational portfolio (coursepack) should fulfil in order to be suitable for ODL are initially presented; afterwards, the Lionarakis' typology (Lionarakis, 2001) is presented and adopted. The use of OER in Open and Distance Learning (ODL) and a methodology for building an ODL course's reading portfolio based on OER is proposed. A detailed syllabus and a study guide complete the resources and integrate everything organically in a system. Finally, a web-based tool called *Course Builder* is presented, which facilitates coursepack authors to build an ODL course according to the Lionarakis' model, based on OER as well as, traditional educational materials in digital format. Applications of Course Builder include: the structured delivery of ODL courses exploiting OER; the guided transformation of plain educational material into an ODL educational portfolio; the easy adaptation of available learning materials to various needs, programmes and learning styles.

Key-words: *Lionarakis' model, Open Educational Resources, Course Builder*

Περίληψη
Ο πολυμορφισμός του εκπαιδευτικού υλικού προάγει την ευρετική πορεία αυτομάθησης των εκπαιδευομένων της ΑεξΑΕ. Σήμερα υπάρχει διαθέσιμη στο Διαδίκτυο τεράστια πληθώρα ανοικτού εκπαιδευτικού περιεχομένου (OER) καθώς και Νέων Μέσων, κατάλληλων για εκπαίδευση. Εξ άλλου, πολλά μεγάλα πανεπιστήμια έχουν πλέον διαθέσει δωρεάν εκπαιδευτικό περιεχόμενο στο Διαδίκτυο, όπως βιντεοσκοπημένες διαλέξεις, παρουσιάσεις, σημειώσεις, ασκήσεις κλπ.
Σ' αυτό το άρθρο, αφού εξετάσουμε τις επιθυμητές ιδιότητες του εκπαιδευτικού πακέτου της ΑεξΑΕ, εστιάζουμε την προσοχή μας στο μοντέλο Λιοναράκη (2001) ως το πλέον εξελιγμένο. Στη συνέχεια προτείνουμε μια μεθοδολογία ενσωμάτωσης ανοικτού εκπαιδευτικού περιεχομένου καθώς και Νέων Μέσων στο εκπαιδευτικό πακέτο ως παράλληλων (αντι)κειμένων. Επειδή τα τελευταία δεν είναι φτιαγμένα βάσει των προδιαγραφών της ΑεξΑΕ, χρειάζεται ένας οδηγός μελέτης για να καθοδηγήσει τον εκπαιδευόμενο στη μελέτη του καθώς και η αναλυτική ύλη του

μαθήματος. Η μεθοδολογία αυτή υλοποιείται με τη βοήθεια μιας διαδικτυακής (web-based) πλατφόρμας παρουσίασης του εκπαιδευτικού περιεχομένου σε ψηφιακή μορφή βάσει του μοντέλου Λιοναράκη, που λέγεται "Course Builder".
Στο κεντρικό παράθυρο του Course Builder (εικόνα 1) εμφανίζεται η ύλη του μαθήματος και γύρω-γύρω όλα τα αντικείμενα του μοντέλου Λιοναράκη. Η εικόνα 1 παρουσιάζει συνοπτικά τον τρόπο υλοποίησης του μοντέλου από τον Course Builder ενώ ο Πίνακας 1 παραθέτει τις πηγές προέλευσης των αντικειμένων και τη θέση τους στην οθόνη του Course Builder. Βασικά πλεονεκτήματα του Course Builder είναι: α) το φιλικό προς τον χρήστη περιβάλλον, β) η παροχή του εκπαιδευτικού υλικού μέσω Διαδικτύου που είναι διαθέσιμη παντού και πάντοτε μέσω κάθε πλατφόρμας, γ) η υποστήριξη διαφόρων μαθησιακών στυλ, κ.ά. Εφαρμογές του Course Builder είναι: α) η δομημένη παροχή του πλήρους εκπαιδευτικού πακέτου μαθημάτων ΑεξΑΕ μέσω Διαδικτύου σε ψηφιακή μορφή δομημένη σύμφωνα με το μοντέλο Λιοναράκη, β) η δομημένη παροχή παραλλήλων κειμένων και πολυμεσικών μαθησιακών αντικειμένων και η οργανική σύνδεσή τους με το βασικό κείμενο, γ) η μετατροπή απλού εκπαιδευτικού κειμένου σε δομημένο κείμενο ΑεξΑΕ, κλπ.

Λέξεις κλειδιά: *μοντέλο Λιοναράκη, ανοικτό εκπαιδευτικό περιεχόμενο, Course Builder.*

1. Importance of the educational material in ODL

1.1. Special educational material

ODL learners are found in distance from the teachers as well as from each other. The learners depend mostly on the educational portfolio, which is much more important than in face to face education. The ODL educational portfolio should enable students to: a) learn efficiently with minimum external aid; b) select the time, place and pace of their study; c) control their progress.
Adult ODL learners need to know why they should study a specific chapter or paragraph and what they will gain by doing so. Since the instructor is not physically present, all this information has to be included in the material. Things that the modern instructor ought to do at the beginning of each lecture (explain the aims and objectives) and at the end (summarise, draw conclusions), must be included in the ODL educational portfolio (Rowntree, 1992; Andreatos, 2007: 46). It has been stated that the educational portfolio (or "coursepack") handed to ODL students, constitutes a set of stored lectures, prepared in advance, either printed or digitally encoded.
Usually ODL students do not avail large, contiguous time intervals for their study; instead, their free time is often limited; ODL texts and supporting materials should be organised in small, autonomous sections.
Consequently, ODL textbooks must be easily readable, analytic and user-friendly; they must not leave questions or ambiguities; they must lead to the consolidation of study; and they must be properly organised (Race, 1989). Moreover, ODL textbooks must contain a set of additional texts supporting the above goals. However, it is difficult for a textbook to support various learning styles at the same time (Honey & Mumford, 1992).
Another issue is that of additional portfolio (course readings or 'parallel texts' in Greek). In higher education the single textbook practice has been abandoned; instructors today suggest additional bibliography (tutorials, papers, books, etc.) and multimedia resources in various formats. For instance, additional reading portfolio for the Information Science graduate programme of the Hellenic Open University may be found at: http://edu.eap.gr/pli. This practice makes students independent from certain

authenticities**,** writing and learning styles.
The additional portfolio should be *polymoprhic* (i.e., offered in a variety of formats) so that it makes study pleasant and not dull, as well as, *highly portable*, so that learners could exploit their time while travelling, using everyday portable equipment such as mobile phones, mp3 players, etc. Hence, educational material format is crucial and should maximise learning freedom and effectiveness. Under this perspective, the role of multimedia educational materials such as video and sound (e.g., podcasts) should be seriously revisited (Snelson, 2009).

1.2. Adapting normal educational materials to ODL

In case there is no special ODL textbook for a specific course, the instructor (educator) and/or institution headquarters or policy makers may choose to use normal educational materials (i.e., written for face-to-face education) and adapt them to ODL. In this case, the instructor or personnel specialised in ODL textbooks will have to write the additional texts as well as, a study guide. (From now on we shall refer to the personnel responsible for preparing or editing the course material as "the author".) These additional texts include: a) the introductory material for each chapter (such as aims, targets, expected results, keywords); b) the concluding material (such as synopses, discussions, bibliography, references, links for further study); c) any intermediate material that will engage students in a deeper understanding of the material, by performing activities such as experiments, self-assessment questions (SAQs), problem-solving, case studies, simulations, programming, etc. (Race, 1989). The answers, the rationale and pre-prepared assessment explanations that will lead to specific further study must also be included.

1.3. The contribution of ICT to ODL

The advance of ICT greatly facilitates ODL towards eliminating the teachers' physical distance, by offering flexible, polymorphic and user-friendly multimedia educational materials. Especially New Media (such as videos) bring the ODL learner closer to the face to face model (e.g., by watching the instructor speaking). Furthermore, ICT offers platforms and tools for communicating and collaborating from distance (Andreatos, 2007). ICT bridges to a large extend the distance between learner and teacher, but also among the students themselves. Commonly available ICT technologies (such as social networking platforms) and tools (such as Skype or various messengers) cultivate the classmate community feeling in virtual communication (Andreatos, 2007: 49-50; Cartelli et al., 2010).
ICT minimises not only the cost of the educational portfolio but also the *cost of access to new information*. For instance, instructors can post the material in specific sites or even send it by email; moreover, they can easily and instantly modify, update or complete the materials, things very difficult to achieve in print.

2. Lionarakis' typology model for ODL textbooks

Various researchers have proposed different typologies for the educational materials (Giosos & Koutsoumba, 2005: 41-46). The most thorough typology was proposed in 2001 by Lionarakis (Lionarakis, 2001: 42-50). A brief presentation of the specific typology is considered an essential background for the rest of the paper. According to the Lionarakis' typology, educational materials can be classified in three classes or sets:

a) (Main) Text, Pre-text (or Co-text) and Post-text; (in Greek: κείμενο, προκείμενα, μετακείμενα respectively);

b) Inter-text or Context, Overtext, Paratext, Retro–text; (in Greek: διακείμενα, επικείμενα, παρακείμενα, περικείμενα respectively);
c) Multitext (additional portfolio, additional materials) and Multimedia materials; (in Greek: πολυκείμενα, πολυαντικείμενα (=πολυμέσα) respectively).

It was not a trivial task to translate the original Greek terms in synonym terms; for instance, the proposed term "Hypertext" for *επικείμενα* was avoided since it has another meaning in English (i.e., text enriched with hyperlinks); similarly, the proposed term "Metatext" for *μετακείμενα* was avoided, since the prefix "meta" has a different meaning in English (consider concepts like metadata and metalanguages). In the following we shall give brief and informal definitions of the above terms. This is important for the reader to understand the functionality of the proposed framework.

2.1. First set

Text is the main reading source (the traditional textbook); i.e., an academically written text covering the course.

Pre-text (or **Co-text**) materials (προκείμενα) act as an introduction to the main text and include a table of contents, introductory comments, elucidations, aims and objectives, expected results, keywords and key-phrases, self-assessment questions (SAQs) and activities etc. (Race, 1989).

Post-text materials (μετακείμενα) are placed at the end of maintext chapters; they constitute a mechanism of reminding the reader what they (should) have learned and also to help them consolidate this knowledge (Race, 1989). They usually include summaries, glossaries of new-learned terms, reviews and synopses, bibliography and further reading sources.

2.2. Second set

The role of **Contexts** (διακείμενα) is to assemble the knowledge presented in small units into a whole; therefore, they ask the reader to perform activities and SAQs spanning the whole text and providing feedback and references to further reading sources.

Over-texts (επικείμενα) offer additional definitions, clarifications of obscure and misconcepted terms, glossaries etc., facilitating the readers to better understand and process the main text and answering possible questions to the instructor of a face to face course; therefore, they have a supporting role.

Para-text (παρακείμενα) are non-verbal formats of information; they include photographs, graphs, diagrams, etc.

Retro-texts (περικείμενα) are embedded boxes with text; they usually include examples, readings, case studies, quotations from other sources; thus, they have a supporting role; they are also used to break the monotonicity of plain text pages.

2.3. Third set

Multi-texts (πολυκείμενα) are additional materials of the educational portfolio. These may be assessment criteria, prerequisite skills and guidelines for performing the activities for problem-solving, and feedback from the instructor to the learners' activities, problems, projects etc. Hence, they strongly vary from student to student.

Finally, **multi-objects** (πολυαντικείμενα, πολυμέσα) are additional multimedia material consisting of additional educational material in digital formats such as hypertext, videos, soundtracks (e.g., podcasts), images, cartoons, delivered either in CD-ROMs, DVDs or BlueRays or via the Internet (e.g. by email or as typed hyperlinks). It is noteworthy that this set does not refer to the functionality of the

educational materials but rather to their format; hence, in a web-based environment, they could be placed according to their functionality.
The recent explosion of New Media has significantly increased the plethora and importance of these materials in education (Snelson, 2009; Andreatos, 2011).
The contribution of this typology is two-fold: a) it covers the multimedia formats of educational materials available today, which, under specific conditions, promote the process of self-learning; b) it proposes an approach for the ODL educational portfolio, which ought to be rich, flexible, powerful (Giosos & Koutsoumba, 2005) and support as many learning styles as possible.
However, a collection of multimedia materials does not constitute an ODL coursepack (Giosos & Koutsoumba, 2005); what is additionally needed is their systematic connection in an organic structure. This is where the contribution of the proposed approach lies.

3. Use of open educational resources in ODL

Open educational resources (abbreviated as OER) are reusable digital materials offered for free and intended to facilitate educators, students and self-learners in teaching and learning (Educause Learning Initiative, 2010; Issack, 2011). OER include various kinds of digital products such as content (tutorials, assignments, tests, drills or even complete online courses), tools, software, implementation resources, best practices, techniques, processes, incentives, licenses etc. (Andreatos & Katsoulis, 2011).
Recently a considerable amount of reusable open educational resources (OER) covering all grades of education has been developed, many of which come from well-respected universities such as Harvard, MIT ('MIT OpenCourseWare'), Stanford ('Stanford Engineering Everywhere') and Yale (see find.pcworld.com/69489). Moreover, a lot of open-access scientific journals are available. These resources can be used as additional educational material by instructors, authors and students (Educause Learning Initiative, 2010; Issack, 2011; Andreatos & Katsoulis, 2011).
OER may come in various formats, including text (doc, html, pdf), sound (mp3, podcasts) and videos, Java applets, Flash content, etc. OER materials are also referred to as **Learning Objects** (abbreviated henceforth as LO's). Learning objects satisfy the faculty need for reusable instructional materials. As far as the content is concerned, LO's may be tutorials, course notes, exercises, examples, drills, FAQs, how-to's, papers, e-Books, presentations, simulations, etc. Usually, LO's are stored in special sites called ***repositories*** and ***referatories***, as well as, official university sites. Open educational resources in various kinds of sites and formats are stored there (Issack, 2011; Andreatos & Katsoulis, 2011).
However, good quality educational LO's may be found in other types of sites hosting articles, presentations, how-to's, animations etc. For instance, a large collection of presentations, many of which are educational, is hosted in www.slideshow.com, as well as, www.authorstream.com.
Youtube contains a lot of educational videos and many university professors maintain their own channel there, although there are also specific sites hosting exclusively educational videos such as SciVee (www.scivee.tv) and LabAction (www.labaction.com) (Snelson, 2009).
In order to facilitate the selection of LO's, we have developed an experimental tool called *LO Finder*. LO Finder is a meta-search engine programmed to search for LO's in specific repositories and sites hosting educational materials. Users can enter a keyword, desired language and format of the LO's (doc, pdf, videos and

presentations). Then LO Finder returns a limited and manageable number of LO's fulfilling the criteria (Andreatos & Katsoulis, 2011).

3.1. Impact of New Media and OER in education

Knowledge is growing exponentially today. The amount of knowledge in the world has doubled during the past 10 years and is now doubling every 18 months. In many fields the life of knowledge is measured in months and years instead of decades, as it used to be some decades ago. While new knowledge appears, existing knowledge becomes out-dated; as a consequence, half-life of knowledge is continuously shrinking. This is especially apparent in scientific and technological fields such as engineering, biotechnology, medicine and information science (Andreatos & Katsoulis, 2011).

Since knowledge is out-dated so fast today, higher education syllabuses continually evolve, to accommodate new courses. New textbooks are needed, while the existing ones have to be continually updated, before they eventually get withdrawn. On the other hand, there is an evolution of New Media and OER in digital formats, which come to fill the gap. As an example, consider Wikipedia; numbers demonstrate its popularity, while research shows that is extensively being used in all grades of education (Eijkman, 2009).

Another issue is the multimedia advantage; images, videos, podcasts, etc., help make teaching more pleasant and facilitate students to perceive new concepts more easily, being at the same time portable, reproducible anywhere, any time; simulations and animations facilitate understanding of difficult issues and misconceptions (Snelson, 2009).

Yet another issue is that of additional portfolio. OER are already being used as course readings; since they come from different sources, they promote independence from specific teaching and learning styles.

A final issue is availability, cost and openness; open educational resources are freely available, facilitating education in all regions of the planet. Several movements and declarations have appeared, such as the *World Declaration on Education For All* and *the Cape Town Open Education Declaration*. For more information the reader may refer to the links of Lemma 'Open educational resources' of Wikipedia.

In conclusion, OER and New Media in combination with Web 2.0 technologies and platforms, drastically shape a new landscape in education, which cannot be neglected. There is a plethora of good quality educational OER available in the Internet and it would be advantageous to locate it and use it in ODL courses. In our effort to locate and exploit OER in ODL, we are developing a tool called *Course Builder*. It is our intention to demonstrate the use of this tool in ODL and education in general.

4. Course Builder: a tool supporting ODL courses with OER

4.1. Methodology

A prerequisite for *Course Builder* to offer pedagogically correct results is the existence of a *detailed course syllabus* and a *study guide*, both usually available in modern higher education courses. A detailed course syllabus presents the text as a set of entitled paragraphs, where each paragraph deals with a specific concept represented by its title; paragraph titles should contain keywords, hence, they can be used as *search terms* to find OER from special sites (e.g. repositories). In ref. (Andreatos & Katsoulis, 2011) we present a special tool facilitating the search of LO's, as well as, a 10-step methodology for enriching or assembling a course from LO's. Authors trying to build their course have to perform a set of searches based on the detailed course

syllabus, in order to find and store supplementary material. What is then needed is an effective way to present these materials to the learners.

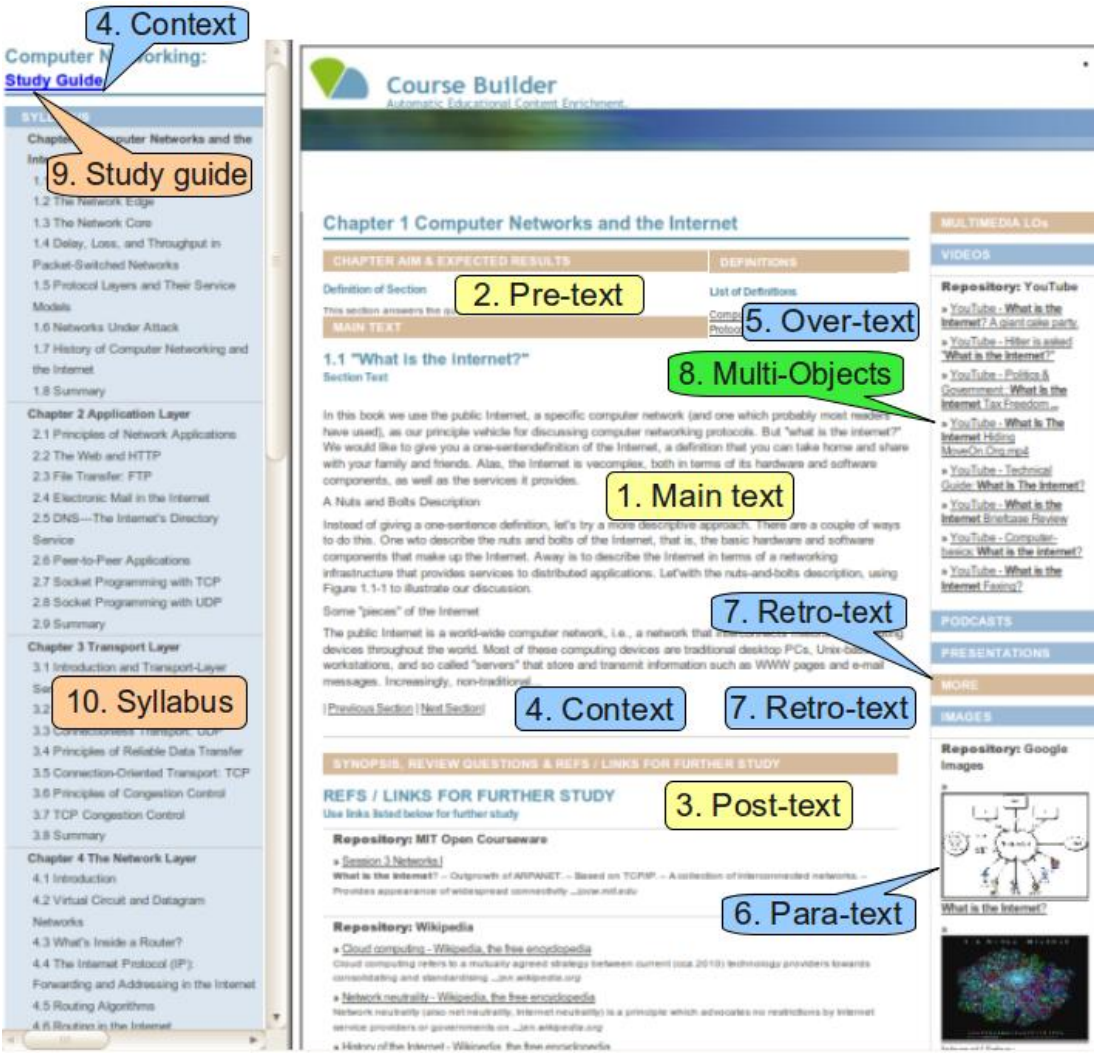

Figure 1 – Course Builder interface implementing the Lionarakis' model

4.2. Course Builder: a web-based tool locating OER and enriching ODL courses

In an effort to locate and exploit OER in a pedagogically correct manner, we have designed a web-based interface presenting the educational materials according to the Lionarakis' model. Figure 1 presents a screenshot of this interface. A web-based educational environment offers some important advantages such as universal use, easy transition to any place of the text as well as easy return, easy search of specific keywords or phrases, multimedia support, easy access from anywhere, portability, interoperability etc., features which are important in ODL and e-learning.

4.3. How Course Builder implements the Lionarakis' model

Let's proceed to a description of the **Course Builder** interface. The screen is divided into two vertical *frames*. On the *left frame*, one finds the whole *syllabus* of the course. This gives the learner an overview of the course, organised in chapters and paragraphs, that is always available; it also enables the learner to easily move to any paragraph, using hyperlinks. The *right frame* consists of a wide column (on the left) and a narrow column (on the right). The main text is located in the centre of the right

frame. This may come from a digital textbook (e-book) or may be written by the author (e.g., course notes) or may link to an external OER source.
It is recommended (if not necessary) for ODL textbooks to contain instructions to the readers. In the opposite case, the author has to add all this information to the *study guide* accompanying the course. A link to the "study guide" is available on the left frame, just above the syllabus. As it became clear from the above description, the proposed framework enables authors to easily adapt a plain digital book (e-book) into an e-book appropriate for ODL. Furthermore, it facilitates the author's job by identifying the places of the various objects of the Lionarakis' typology. By its construction, it enforces the Lionarakis' model to authors less familiar with the specific typology as well.

4.3.1. Implementation of the first set

In the proposed framework the main text is displayed in the main window; the windows above and below display the introductory (pre-text) and concluding (post-text) material added by the author. The advantage is that all components of the first set are presented in a uniform way; otherwise, the students would have had to look for the introductory and concluding material in another document (such as the study guide).

4.3.2. Implementation of the second set

Context, i.e. activities, tests, self-evaluation questions, quizzes etc. are often embedded in modern good-quality textbooks; hence, they will appear in the main window. Otherwise, the author will have to manually add them in the study guide.
Overtexts play a supporting role; they are implemented as supplementary definitions quoted from online encyclopaedias and dictionaries such as Wikipedia, www.about.com, www.archive.org, www.worldbookonline.com, www.answers.com, www.whatis.com, www.howstuffworks.com, etc. They appear just above the Main window.
Paratexts, i.e., non-textual means for supporting texts, such as charts, images, tables, photographs etc., are represented by related images drawn from Google images based on the keywords (used as search terms), placed at the rightmost column of the main window, at the bottom.
Retro-texts, i.e., course readings, reference texts and supplementary books. Modern textbooks often contain examples, case studies, scenarios, "principles in practice", etc., will appear in the main text window. In addition, Course Builder presents related free and open eBooks in the rightmost column of the right frame.

4.3.3. Implementation of the third set

Multitexts are extra portfolio, related to the assessing guidelines of the instructors and their way of providing feedback and communicating with each student; hence, they are not implemented in Course Builder.
Finally, **multiobjects** consist of educational videos, presentations and podcasts drawn from selected sites (repositories, referatories and other New Media sites containing videos, presentations, podcasts etc.). They are located at the top of the rightmost side of the right frame. Modern mobile devices such as smart phones and pm3/mp4 players allow learners to study these multimedia Learning Objects on the go, exploiting adult learners' time further. Table 1 summarises the Lionarakis' typology implementation strategy followed by Course Builder. As a key, Table 1 rows colours correspond to Figure 1 tag colours. The third column comments on the origin of the various

typology objects (author, OER etc.); finally, the fourth column describes the place of each typology object on the Course Builder screen.

Table 1 – Way of implementation of Lionarakis' model with Course Builder

No.	Typology	**Source**	Location
1	Text	Digital textbook (e-book) or written by the author (e.g., course notes) or an external source such as online OER	Main window of right frame
2	Pre-text	ODL textbook author or course author (in case of a non ODL-text); term definitions from online encyclopaedias & dictionaries in real time; table of contents at the left frame	Just above the Main window; Alternatively, in the study guide
3	Post-text	ODL textbook author or course author (in case of a non ODL-text); bibliography and further reading sources including free eBooks	Just below main window; Alternatively, in the study guide
4	Context	Textbook or e-book; otherwise, added by the author	Main window; alternatively, included in the study guide
5	Overtext	Online encyclopaedias and dictionaries	Just above the Main window
6	Paratext	Google images based on the paragraph keywords used as search terms	Rightmost column of the main window, at the bottom.
7	Retro–text	Modern good-quality textbooks or free and open eBooks from the Internet	Main text window or rightmost column of the right frame
8	Multiobjects	Repositories, referatories and other New Media sites	Top of the rightmost side of the right frame
		EXTRAS	
9	Study guide	Prepared by the institution and/or the author	Link on the top of the left frame
10	Syllabus	Prepared by the institution and/or the author	Left frame

4.3.4. Use of Course Builder

Phase A: preparing the course materials. Before an educator uses Course Builder, he or she has to first gather the educational materials, as well as, write the syllabus and the study guide. LO Finder may be used in this phase (Andreatos & Katsoulis, 2011).

Phase B: assembling the materials. During this phase the author has to enter all the above materials in the template provided by Course Builder (Fig. 1), which, by

design, implements the Lionarakis' model, as we have already explained. Then the author has to link all external OER to their proper location. Note that the **edit mode** is protected by password since only authorised personnel may alter a course.
Phase C: releasing the course portfolio. Finally the author saves the changes, tests the result and makes any necessary changes. The coursepack
is ready for use by the ODL students.

4.3.5. Future work

It would be convenient for authors to have LO Finder incorporated into Course Builder, so that they can complete all the above phases using a unique tool. So this is our plan for the future.

5. Conclusion

In this paper we have presented Course Builder, a web-based tool and environment organising the ODL educational portfolio after the Lionarakis' model.
Course Builder supports ODL authors in:

- adapting normal digital educational materials for distance education;
- building new ODL courses;
- enriching their courses using OER in multimedia formats;
- adapting available learning materials to various needs, programmes and learning styles (undergraduate programmes, postgraduate programmes, continuing education programmes, etc.).

Course Builder offers the following advantages to ODL learners:

- Course Builder provides a user-friendly interface and presents learners a variety of multimedia OER supporting most learning styles.
- Multimedia LO's have various durations and formats; this makes possible their transfer in portable devices such as smart phones, facilitating adult learners to study on the go.
- The tool is web-based, thus providing interoperability and ubiquitous operation.
- The tool enables the use of a traditional textbook (in digital format) in an ODL environment.

Prerequisites for this method to work effectively are a detailed course syllabus and a study guide. There, the author will have to explain the use of each LO to the readers, as well as, to organically connect the various educational materials into an ODL course (Andreatos & Katsoulis, 2011).
Course Builder may be used in conjunction with an official e-book used by the ODL institution or even independently. In this latter case, it could be used in conjunction with OER such as open university courses, open web 2.0 educational platforms (such as Wikiversity and WikiEducator), or online encyclopaedias and dictionaries, in which case, its effectiveness depends on the course syllabus.

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