Materials design for the digital enrichment of the Greek EFL textbooks

Σχεδιασμός εκπαιδευτικού υλικού για τον ψηφιακό εμπλουτισμό των εγχειριδίων αγγλικής

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This paper provides an overview of the pedagogical design and the types of digital materials that were produced to enrich the Greek State EFL textbooks for primary and junior high school in the context of the Digital School Project. The first part of the paper presents the principled approach to enrichment that was developed for the production of digital materials while the second part analyzes the different types of digital materials that were produced, following Tomlinson's (2003) categorization of EFL materials. The paper suggests that digital enrichment should include a variety of teaching materials in order to cover various aspects of the EFL curriculum, to offer EFL teachers a variety of tools and applications to enrich their teaching methodology, and to enhance EFL learners' experience with the textbook, taking into account varying learning styles and needs.

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Το άρθρο αυτό παρουσιάζει τον παιδαγωγικό σχεδιασμό και τα είδη ψηφιακού εμπλουτισμού τα οποία αναπτύχθηκαν στο πλαίσιο του έργου «Ψηφιακό Σχολείο» για τον εμπλουτισμό των σχολικών εγχειριδίων αγγλικής για το δημοτικό και το γυμνάσιο. Το πρώτο μέρος της εργασίας παρουσιάζει την έννοια του εμπλουτισμού και τις αρχές στην οποία στηρίχθηκε ο ψηφιακός εμπλουτισμός των αγγλικών εγχειριδίων, ενώ το δεύτερο μέρος αναλύει τα διάφορα είδη ψηφιακού εμπλουτισμού με βάση την κατηγοριοποίηση του Tomlinson (2003) για το εκπαιδευτικό υλικό διδασκαλίας της αγγλικής. Υποστηρίζεται η άποψη ότι ο ψηφιακός εμπλουτισμός θα πρέπει να περιλαμβάνει ποικιλία εκπαιδευτικού υλικού ώστε να καλύπτει διάφορες πτυχές του προγράμματος σπουδών, να προσφέρει στους καθηγητές και τις καθηγήτριες αγγλικής μια ποικιλία εργαλείων και εφαρμογών που θα εμπλουτίζουν τη διδακτική τους μεθοδολογίας, και να ενισχύει την εμπειρία των μαθητών με το σχολικό εγχειρίδιο, λαμβάνοντας υπόψη διαφορετικές τρόπους μάθησης και ανάγκες των μαθητών.

Key words: materials design, EFL digital materials, digital enrichment, informative materials, instructional materials, experiential materials, exploratory materials

1. Introduction

The Digital School project is a large scale project which aims to promote ICTs and to develop a digital culture in Greek schools. Funded by the Greek state and the European Union and implemented by the Computer Technology Institute and Press, it includes a number of actions, such as the development of an open access educational platform; the digitization of all textbooks used in Greek primary and junior high schools; the digital enrichment of Greek textbooks with multimedia materials; the collection of available digital resources (e.g., photos, audio and written texts, videos, digital educational materials) from various sources such as the Educational TV, the National Audiovisual Archives, Libraries and Museums; and the development of a national repository of learning objects for primary and secondary education (Figure 1). This paper focuses on the design and implementation of the digital materials developed to enrich the Greek State EFL textbooks and it argues that the digital enrichment of EFL textbooks should be multi-faceted, covering different aspects of the EFL curriculum and taking into account both teachers' and learners' perspectives. The paper starts by presenting the rationale, the principles and the criteria followed by the English Group and then moves to the different types of digital materials elaborating on Tomlinson's (2003) categorization of ELT materials. It should be clarified that the perspective adopted in this paper is that of the materials designers aiming to explicate the principles and the employed procedures used for the development of digital EFL enrichment materials.

In discussing the role of digital enrichment materials in EFL textbooks, we should keep in mind two key features. First, most of these materials may be used on their own, but their primary function is to complement an existing textbook and its associated curriculum. This feature affects considerably, as we shall see below, decisions taken concerning the type and the extent of the produced digital materials. Second, the EFL textbooks we are presently dealing with are not textbooks that have been originally designed to function in an online context but they are digitized forms of textbooks that were designed for the print mode.

Figure 1: The homepage of the Digital School Project (www.dschool.edu.gr).

The digitization of these textbooks has followed a number of stages. Initially, the .pdf form of the books was turned into .html form. In this way, each chapter of a textbook was turned into a website, a canvas upon which additional interactive materials could then be added through hyperlinks. Eventually, the enriched textbook – consisting of the digitized textbook and the digital materials that have been added to enrich it – was made available through an open access platform which provides open access to all digital textbooks and materials.

In the context of the Digital School Project, the English Language Group worked systematically from February 2011 to April 2014 in order to develop digital enrichment for five EFL textbooks for junior high school (the *Think Teen!* series for 1st Junior High Beginners and Advanced, 2nd Junior High for Beginners and Advanced and 3rd Junior High) and four textbooks for primary school (grades 3 to 6). The Group consisted of 14 members,[1] including nine highly qualified teachers of English with extensive experience in EFL materials development and ICT training, two e-learning experts, two computer engineers, and the author of this paper as the coordinator. In order for these specialists from different disciplines to work efficiently together, it was important from the beginning of the project to build a form of group solidarity, to explore the expertise and potential of each group member, to establish a common understanding of the notion of digital enrichment, and to develop a set of principles and criteria for the enrichment of EFL textbooks.

2. The notion of enrichment

Educational researchers have variously defined enrichment as acceleration or curriculum compaction for gifted students only (Clendening & Davies, 1983); as opportunities for personal and social development for all students, giving greater fulfilment and intellectual satisfaction than the basic curriculum (Piggott, 2004); or as a set of techniques that can be used flexibly for students' educational needs (Feng, 2005). Despite its different meanings as enhancement, refinement, upgrading or augmentation, enrichment has always been viewed as an add-on quality, something attached to something else (e.g. a curriculum or a textbook).

The notion of enrichment in foreign language teaching is recorded as early as 1939 when Vera Peacock first talked about "enriching a basic textbook along broadly cultural lines" (Peacock, 1939, p. 24). Although at the time Peacock referred to realia, such as maps, photographs, posters, newspapers and magazines, she identified a number of enrichment principles which are of significance even today and which may be relevant to other types of enrichment, such as the digital one, discussed in this paper. According to these principles, enrichment should not develop into ends in themselves, but it should be kept 'subservient' to the aims of the textbook; it should not overload an already crowded syllabus; it should be taught, not simply presented to students; it should establish some kind of connection with students' lives; and it should be related to a specific textbook each time, not be decided definitely for all situations (Peacock, 1939, pp. 24-29).

In more recent accounts, enrichment in ELT has often been conceived in terms of materials adaptation (Richards, 1999; 2001). Various forms of this adaptation include:
- Adding materials to address specific needs (e.g. an examination requirement).
- Extending materials to provide additional practice for a specific aspect of a textbook or to provide opportunities for more personalized practice.

- Modifying materials to give them an additional or an alternative focus in order to address the needs of a particular group of students (e.g. because of their age, gender, occupation, social or cultural background).
- Localizing materials[2] (by adapting or supplementing them) to make them relevant to a specific target group.

From the above it becomes clear that regardless of the different forms it may take, enrichment refers to a quality that cannot stand on its own, but that it requires the existence of what it qualifies, in our case, the EFL textbooks. However, as Feng (2005) argues, how we define enrichment will have significant implications for the issues related to it: for whom enrichment is meant and why, where and when enrichment should take place, which parts of the curriculum should be enriched and how students could benefit from it. In order to take informed decisions about these issues, we developed a principled approach to enrichment which is briefly outlined below.

3. Principles for the digital enrichment of EFL textbooks

Problematizing the notion of enrichment, the first step of the English Group was to come to an understanding of the notion of digital enrichment in EFL textbooks and to define the concept within the context of our work. This proved quite a challenging task, since it is a practically unexplored territory in related literature. During the first year of the project, we developed a number of principles upon which we based our materials development approach. Although they were later refined in the second and third year of the project, these principles have actually guided our work from the very beginning. According to this principled approach,

- *digital enrichment should be systematic, targeted with specific aims, and running throughout the book (principle 1).*

In this way, we wanted to exclude the danger of attempting incidental enrichment in different parts of a textbook. Systematic enrichment also meant that both EFL learners and teachers would be familiar with the types of enrichment found in the textbook and in this way, as they progress through the chapters, they would know what to expect and how to use the enrichment material. Second,

- *an analysis of the digital textbook should precede any decisions made for the type and extent of digital enrichment (principle 2)*

A routine was established for the preparatory stages of enrichment: the first step involved analysis of the students' book (for the overall structure of each chapter), the teachers' book (for the employed teaching philosophy and the pedagogical approach) and the workbook (for the scale and amount of offered activities) by group members. The second step included meetings with the authors of the books to get their insight both on the difficulties they encountered during the production of the book (e.g. constraints imposed by the Ministry of Education and/or by the publishers, copyright issues, etc.) and their suggestions for digital enrichment. The next step involved discussions with EFL teachers who used the specific textbook in the classroom and interviews with EFL learners. Next a list of possible types of enrichment was prepared. From the above, it becomes clear that

- *enrichment should not follow the same design for all textbooks (principle 3)*

but the analysis conducted by group members each time should bring to the foreground the types of enrichment that would be appropriate for each textbook. For instance, some textbooks were found to be quite dense with a lot of materials in each unit, long texts and challenging vocabulary. Digital enrichment in these cases would focus on illustrating existing features of the textbooks, not adding new content to already dense textbooks. Most importantly, it must be pointed out that

- *the nature of the intervention should be supportive of the textbook not subversive of textbook philosophy. (principle 4)*

In other words, the employed approach and the spirit of the digital enrichment is a positive one, not a corrective one trying to "fix" possible problems of a textbook or "improve" its teaching philosophy. Most importantly, during the preparation stages the different types of enrichment prepared by our group were piloted in Greek EFL classrooms. Important feedback from this piloting resulted in changes and improvements of the produced materials. In addition, whenever possible, attention was paid to

- *deliver the produced resources in different forms for multiple use (principle 5)*

and in this way to offer teachers the flexibility to select from a range of different forms the one that would best fit their particular educational aims each time. Finally, taking into account that

- *digital enrichment is a multidisciplinary project which requires the cooperation of different specializations (principle 6)*

group members were asked to collaborate in order to develop digital learning objects for all chapters of the textbook in a similar way. This ensured that during the project, all members had equal opportunities to be engaged in different types of digital materials and to develop similar pedagogical and technological expertise.

In what follows, discussion focuses on the pedagogical design of the digital materials along the lines of the categorization attempted by Tomlinson (2003). Different types of digital enrichment are presented together with specific examples.

4. Pedagogical design of digital EFL materials

Reporting on earlier studies, Tomlinson (2012) suggests that during the production of EFL materials, developers rely mostly on previous materials which have worked for them, on successful publications or on their creative inspiration, but they do not generally rely on a principled framework or criteria. The situation becomes even messier since we move from the writing of EFL materials to be delivered through the print mode to the designing of multimedia materials to be delivered digitally. Materials developers in this case have to take into account the complex ways in which the various semiotic modes will be combined, as well as the role and pedagogical aim of each semiotic mode in the final product.

During the three years of materials development, as a group we faced a number of challenges related to the above issues and we went through a number of phases of development. For instance, in the first year of the project we started with more modest productions, whereas later in the second and third year we experimented and explored more complex and demanding applications in terms of both content and multimedia design. Consequently, in the enrichment of the EFL textbooks we followed a recursive route: after completing the first phase of enrichment, the following year we would go back to it with new ideas for additional enrichment types and applications.

Looking back critically over our work with some kind of self-reflection, we have come to the realization that our produced materials may be categorized according to the types of educational materials that are identified by Tomlinson (2003). This categorization involves the following types:

- Informative materials, informing the learner about the target language
  e.g. glossaries, picture dictionaries, grammar comics, infographics and audio extracts
- Instructional materials, guiding the learner in practising the language
  e.g. edugames, reading and listening apps, self-assessment tests
- Experiential materials, providing the learner with experience of the language in use
  e.g. digital stories, virtual tours and interactive maps
- Exploratory materials, helping the learner to make discoveries about the language
  e.g. a Mystery and a Lost series, English Quests and writing apps

Considering that instructional and informative materials are the two most extensively used in the language classroom (Richards, 2001, p. 251), it is not surprising that in the first year of our work we primarily focused on the development of instructional digital materials.[3] Later, as we progressed and became more confident, we started exploring new territories, experimenting with other types of software and types of materials. Table 1 provides an overview of the different types of digital enrichment materials developed for the Greek state EFL textbooks along the lines of the four categories of materials described above.

	INFORMATIVE	INSTRUCTIONAL	EXPERIENTIAL	EXPLORATORY
AIMS	*Inform learners about language*	*Guide learners in practising the language*	*Provide exposure to language use, facilitate personal engagement*	*Help learners make discoveries about language*
PRIMARY SCHOOL	Audio extracts Picture dictionaries Grammar comics	Edugames Self-assessment tests Reading apps	Digital stories Virtual tours Interactive maps	Mystery and Lost series English quests Writing apps
JUNIOR HIGH SCHOOL	Audio extracts Glossaries Infographics	Edugames Self-assessment tests Listening apps	Digital stories Virtual tours Interactive maps	Mystery and Lost series English quests Writing apps

Table 1: Types of digital enrichment materials for the EFL textbooks.

4.1 Informative materials

The aim of these materials, as their name indicates, is to inform EFL students about different aspects of the target language. A number of applications developed to enrich the Greek state EFL textbooks for both primary and junior high school fall within this category. Most of these applications were developed during the initial phase of textbook enrichment while some others were later additions. Informative materials include glossaries and picture dictionaries for vocabulary building, grammar comics and infographics for introducing specific lexicogrammatical features, and audio extracts for listening comprehension activities.

4.1.1 Audio extracts

When the *Think Teen!* series textbooks were produced a few years ago, the audio extracts for listening comprehension activities were not recorded, so our group gave a priority to this type of enrichment. The recordings took place in a professional studio under the guidance of experienced members of our group. A number of native and non-native speakers of different ages participated as speakers in the recordings. Next, the recordings were placed on the html of the textbook next to the instructions of each listening activity (Figure 2). In this way, they were made available for handy use in the classroom through the use of an interactive board, or for self-study, since learners could be listening to these extracts on their own from their home computer. All recordings used in a textbook were also made available together in a folder through the main menu of the textbook for teachers who would like to have them stored in a CD-ROM, USB stick or other digital medium to use them in a classroom with no internet connection.
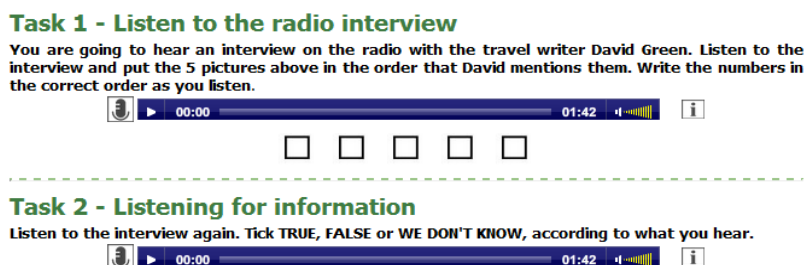
Task 1 - Listen to the radio interview
You are going to hear an interview on the radio with the travel writer David Green. Listen to the interview and put the 5 pictures above in the order that David mentions them. Write the numbers in the correct order as you listen.

▶ 00:00   01:42   i

☐ ☐ ☐ ☐ ☐

Task 2 - Listening for information
Listen to the interview again. Tick TRUE, FALSE or WE DON'T KNOW, according to what you hear.

▶ 00:00   01:42   i

Figure 2: Audio recordings on the html of the EFL textbook next to listening comprehension activities.
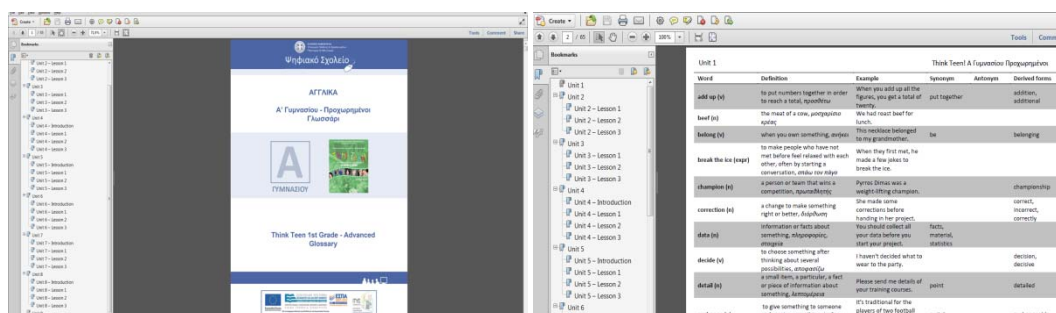
4.1.2 Glossaries

Glossaries were prepared for all five *Think Teen!* series textbooks, ranging between 600 to 2,000 terms each. Since their purpose has been to function as enrichment to a specific lesson in the textbook, and not as a general purpose lexicon, glossaries include only the meanings found in the specific texts. Every term in the glossaries includes a number of required fields (a code number for unit and lesson, the term, its definition and an example) and optional fields (synonyms, antonyms and related words). A number of technical solutions were considered and it was finally decided to use the glossary option of the open source platform. A primary consideration during the production of the glossaries was the delivery of this useful material in different ways to allow various views of the content: EFL

learners and teachers may search a glossary in different ways (all of it, alphabetically, per unit or per lesson) depending on their needs. Glossaries may be accessed online through the html of the digital textbook at the beginning of each lesson (Figures 3-4). They may also be accessed in an interactive pdf form that can be downloaded and printed through the main menu of the digital textbook (Figures 5-6).
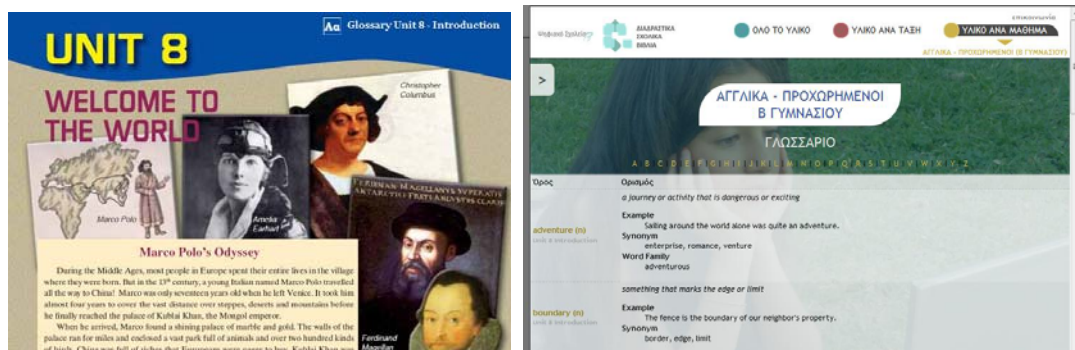
Figures 3-4: Glossary hyperlink on the interactive book (left) and view of glossary per lesson (right) (from Think Teen! 2nd Grade of Junior High School, Advanced)


Figures 5-6: View of glossary in an interactive .pdf form (from Think Teen! 1nd Grade of Junior High School, Advanced).

4.1.3 Picture dictionaries

While glossaries were produced for the *Think Teen!* series, picture dictionaries were prepared for the 4th, 5th and 6th grade EFL textbooks in order to illustrate new vocabulary items. Taking into account that the same themes appeared in different textbooks, it was decided to organize the picture dictionaries in terms of themes, not in terms of textbook units or lessons. Most importantly, organizing the picture dictionaries thematically has allowed their use in different parts of the same digital textbook or in different textbooks.

Initially, considerable time was spent by group members to identify the main themes and the words to be included in each one of them. Thirty themes (e.g. animals, climate, clothes, food, hobbies, jobs, musical instruments, school, etc.) were identified and a number of words that could be visually illustrated were selected. These words were then grouped into sub-themes so that they could be presented together in a contextual way. For instance, each

one of the slides in the picture dictionary on household chores presents a different room of the house and the things that need to be done in each one of them (Figures 7-8). Overall, EFL learners have the opportunity to see a picture of a word included in the picture dictionary, check its spelling, and listen to its pronunciation. In addition, whenever possible picture dictionaries are also enriched with meaningful animations, graphical representations, music and songs (e.g. a halloween song introduces the halloween picture dictionary).
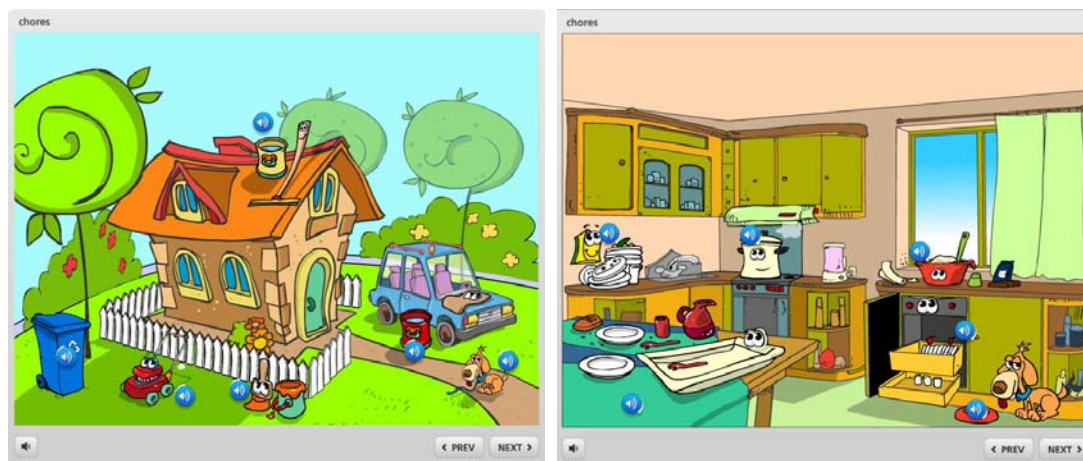
Figures 7-8: Screenshots from the household chores picture dictionary.

4.1.4 Grammar comics

Comic strips and cartoons are considered powerful teaching tools especially for primary school EFL learners, according to Graham (2011), allowing the narration of a complete story in a few images, through easily identifiable characters – who form the basis for the sketches – and short dialogues. Comics have been found to create an environment that is conducive to learning, enhances reading skills and adds humour in the language classroom (Kew & White, 2009; Liu, 2004; Ujiie & Krashen, 1996). In the context of the Digital School project, grammar comics were prepared for the 6th grade EFL textbook, whose aim was to illustrate a grammatical feature in a contextual way. A storyline was first prepared by content developers and next the comic strips were designed using freeware software. The theme of each comic strip is loosely related to the theme of the lesson for which it has been prepared. Consequently, these grammar comics can also be used as stand-alone multimodal materials. For instance, the following extract is from a comic strip entitled 'interviewing a star' which aims to exemplify the use of Present Perfect tense. Learners are exposed to how a particular grammatical feature is used in practice through a scenario-based comic.
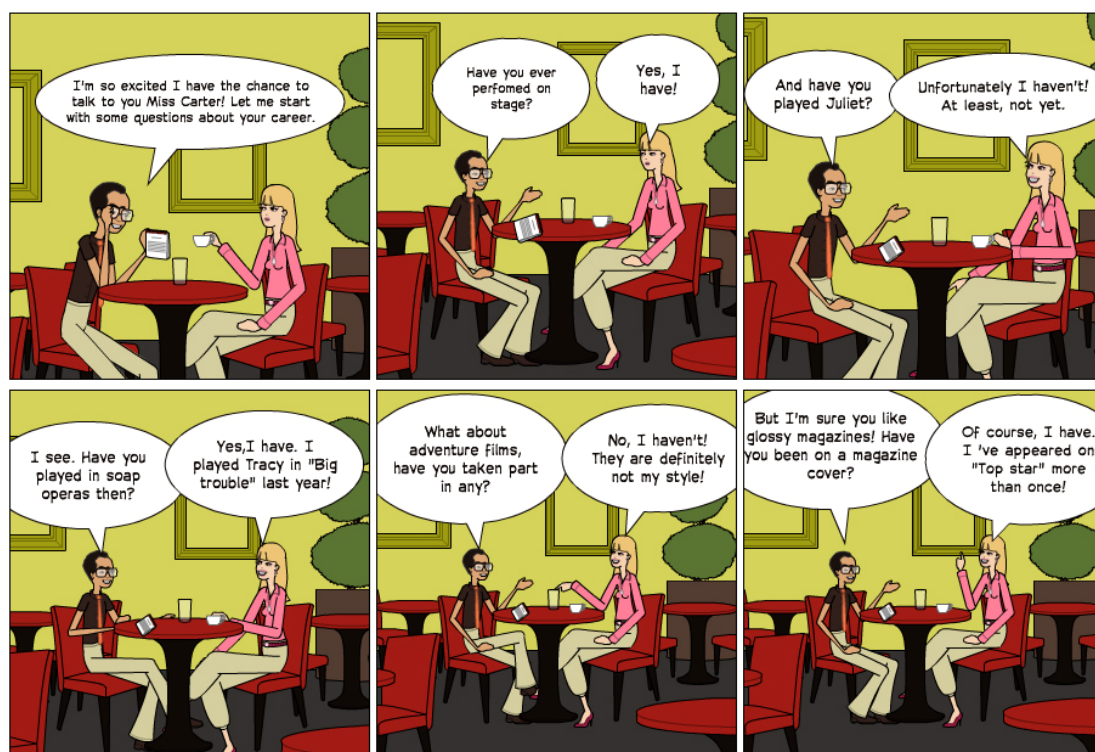
Figure 9: Extract from the 'interviewing a star' grammar comic.

4.1.5 Infographics

Although infographics were initially used to present dense statistical information, today the term refers to any visual representation presenting some kind of information which can be difficult to read as a written text, but which can be quickly accessible when transformed to a visual text. Infographics have been found to be quite useful in the teaching of English[4] because they convey a lot of information using few words, they are much easier to read and remember, and they build on learners' visual literacy. They use colourful graphics with circles, lines, triangles, etc., and brief, easy to remember text. They can be used as posters in the classroom to illustrate, for instance, a particular grammatical feature (e.g. co-ordinating conjunctions), new vocabulary (e.g. idioms about money or easily confused adjectives), punctuation rules (e.g. how to use semi-colon), or a writing technique (e.g. point of view in a narrative). Infographics were developed by the English Group in order to illustrate different aspects of the EFL textbooks (Figure 10). Their aim is to represent visually useful information that EFL students will need to remember.
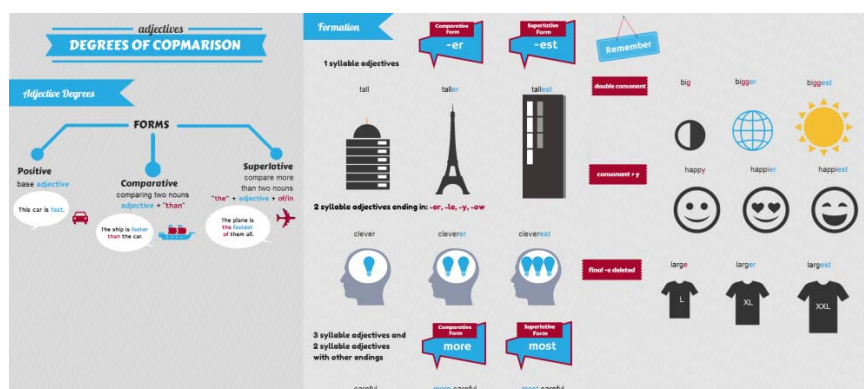
Figures 10: An infographic illustrating different uses of comparative forms

4.2 Instructional materials

According to Richards (1999, p. 50) "effective instructional materials in language teaching are based on theoretically sound learning principles, are appropriate to the learners' needs, provide examples of how language is used, and provide opportunities for communicative and authentic language use". Together with informative materials, instructional materials are the ones mostly used in the English classroom. Their aim is to guide the learner in practising the language. The types of instructional materials that were produced include edugames, self-assessment tests, reading and listening apps.

4.2.1 Edugames

Games have been found to facilitate language learning, whether these may be games involving physical movement (Tomlinson & Masuhara, 2009) or online games (Henry, 2013; Liang, 2011; Turgut & Irgin, 2009). Digital edugames have been prepared for all EFL digital textbooks that have been enriched with digital content. On average, six edugames were prepared for each textbook unit, with the main aim to offer practice in specific lexis and grammar presented in it. Ten flash-engines for well-known games and puzzles (e.g. crossword, hangman, anagram, matching, cloze text, sentence restructuring, and multiple choice) with a friendly interface were used. Particular attention was paid to the graphics of these edugames: illustrative graphics with simple lines were prepared for young teenagers[5] (Figure 11), more colourful and appealing for 5th - 6th graders, and more playful for 3rd- 4th graders (Figure 12).

Humorous names were selected for the games in an attempt to attract young learners' interest: for instance *Wordmind* (for hidden words), *Blank Tank* (for cloze text), *Jumble Jungle* (for jumble sentences in a paragraph), *Go figure!* (for jumble words in a sentence), *Double Jeopardy* (for multiple-choice with 2 possible choices) and *Triple Jeopardy* (for multiple-choice with 3 possible choices). The advantage of the specific flash-engines is that they allow the replay of the same game with different content. For instance, a crossword may have stored 50 words with their hints from a specific lesson (Figure 11). Every time that a student presses the 'try again' button, the flash engine randomly selects some words and their hints from the ones that have been saved in it and a new crossword with different words appears on the screen, allowing the EFL learners to play the same game several times and to consolidate the vocabulary found in a specific lesson. For visibility purposes, the

games are placed through hyperlinks at the beginning of each lesson, together with all other digital resources available for the specific lesson and they are indicated through specially prepared buttons (Figures 13-14).

Figures 11-12: A crossword for teenagers (left) and a matching edugame for 3rd-4th grade (right)

Figures 13-14: Digital edugames at the beginning of each lesson on the html version of the primary (left) and junior high school (right) textbooks

4.2.2 Self-assessment tests

One of our main considerations in the digital enrichment of the Greek EFL textbooks has been to make accessible the existing materials of the textbook and to foreground the rich materials they offer. In this case, revision tests from the teachers' books, which, according to the conducted textbook analysis, were rarely used in the classroom due to lack of time, were transformed into online self-assessment tests to be used by learners. The free software Net Quiz Pro 4 was selected for this application. Quite surprisingly, this task proved to be more challenging in its implementation than initially thought, only to prove once more, that the move from the print genre (in this case the genre of test) to the online genre (the self-assessment test) is a complex procedure involving employment of different representation modes (Jewitt, 2002; Snyder, 1998). Specifically, the internet medium added unique properties to the online genre in terms of production, distribution and reception which have affected the genre itself and had to be taken into consideration (Askehave & Nielsen, 2005). Consequently, activities had to be redesigned for the new digital environment.
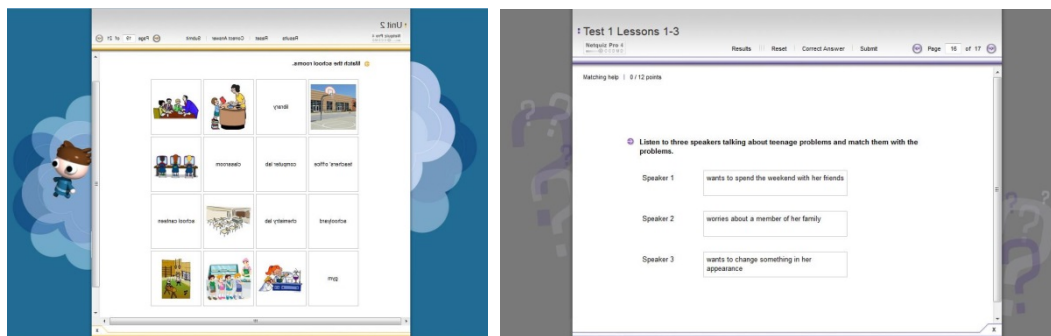
Figure 15-16: A picture-word matching quiz (left) for the 5th grade textbook and a listening activity for one of the junior high school textbooks (right)

4.2.3 Listening apps

In our attempt to maximize the use of the offered resources, we used the recorded audio extracts for the listening comprehension activities in order to produce listening applications for additional practice. Fifty-nine such applications were developed for the *Think Teen!* series textbooks. Each one of these applications is based on a specific audio recording and the activities found in the book, with some additional activities where necessary. The applications consist of an introductory page resembling an online newspaper or a website (Figures 17-18), a number of listening comprehension tasks, the audio recording, its transcript and a glossary (when necessary). Learners may choose to listen to the recording through the embedded player as many times as they wish, or they may choose to read and listen to the audio extract at the same time.

Figures 17-18: Screenshots from the homepages of two listening applications for junior high school textbooks, simulating a newspaper (left) and a webpage (right)

4.2.4 Reading apps

Reading apps are interactive applications developed for 4th, 5th and 6th grade EFL textbooks and they are based on a reading text each time. They include a storyline and they are accompanied by activities that illustrate specific aspects of the texts. Their aim is to facilitate reading by supporting comprehension with graphics, visual materials and sound

(Derewianka, 2003). Each reading app has its own unique structure which is outlined by content developers in a storyboard before it is transferred into its digital form. This variety in structure may be seen as a feature that will trigger learners' curiosity and motivation, since they are encountered with a different type of application every time they use one. Generally, the first part of a reading app application presents a reading text in a visual way, also supported by an audio text, while the second part of an application includes reading comprehension activities of different kinds in the form of quizzes and puzzles to be solved.

Figures 19-20: A reading text as it appears on the textbook (left) and a screenshot from the reading application prepared for it (right).

4.3 Experiential materials

As Tomlinson (2003) indicates, experiential materials provide learners with experience of the language in use by facilitating personal engagement. The digital experiential materials that were prepared to enrich the EFL textbooks are based on visual and multimodal texts. They include virtual tours, interactive maps and digital stories. However, unlike the instructional materials presented in section 6, experiential materials do not include any language activities. They are meant to function as additional resources and it is left to EFL teachers to decide how they are going to be used in the classrooms.

#### 4.3.1 Virtual tours and interactive maps

Geographical information plays an important role in EFL textbooks. Learners are often asked to understand the notion of space, to communicate spatial concepts in English, to analyze spatial relationships in the target language, to learn about countries and culture, and about various places they have never visited. In our project we used Google Earth, the most popular technological map tool today, in an attempt to make spatial relationships more relevant to EFL learners (Patterson, 2007). After recording landmarks and locations which are included in the various activities in the Greek EFL textbooks, we prepared short videos for each one of them, using the tools offered by Google Earth. The prepared applications are movie-like short tours of cultural sites enriched with enhanced navigation, street view imagery and 360˚ panoramic views of selected landmarks (e.g. the statue of Liberty in New York, Taj Mahal in India, Pisa in Italy). The mapping of the area and the specific buildings make this virtual tour quite realistic for the viewers. The aim of these applications is to offer an additional resource allowing learners to 'visit' a specific location. For instance, after

learners have read a text about the Sydney Opera House in their textbook (Figure 21), they may watch a short virtual tour (Figure 22) in order to enhance their experience of the specific building.

Figures 21-22: A text on the Sydney Opera House as it appears of the EFL textbook (left) and a screenshot from the virtual tour on Sydney Opera House (right)

In addition to virtual tours, interactive maps of different kinds were produced by group members. These are autonomous learning objects that also focus on geographical landmarks presented in the EFL textbooks, as the one presented below on India (Figures 23-24). Their aim is to offer rich, cultural experience to EFL learners. A variety of texts are used in these applications. These include picture galleries, short videos, short written texts with useful information, and maps of different kinds enriched with hot spots containing pictures, audio or written text.
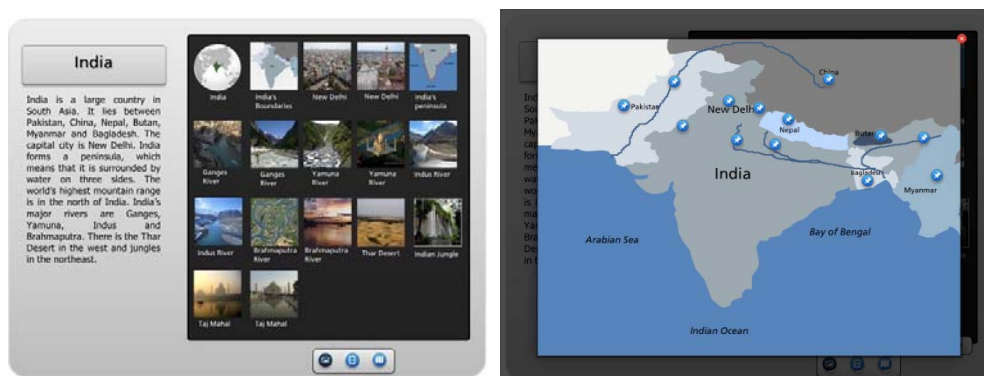

Figures 23-24: Screenshots form an interactive map on India

4.3.2 Digital stories

Digital stories have become very popular with web 2.0 technologies in language education (Alexander & Levine, 2008; Ohler, 2005). In some educational contexts, students are asked to produce their own short video clip where they combine images, text, recorded audio narration, music and video in order to present information on a specific topic or to narrate a story from their own viewpoint, most often in first person narrative (Robin, 2008). The

digital stories produced as enrichment resources by our group members are visualizations of reading texts in video form. A dramatization of the reading texts is achieved through the integration of several semiotic resources such as the audio recording, verbal cues or subtitles, music, sound effects, still and moving images. The aim of this type of digital enrichment is to familiarize EFL learners with some demanding texts, not to function as reading comprehension materials (such as the reading apps), and for this reason, digital stories are not accompanied by comprehension activities or quizzes. The selected texts which have been turned into digital stories may be about an important person (hero or character stories), stories about specific events (accomplishment or adventure stories), personal stories (e.g. about family celebrations), narratives (short stories, myths and folk tales), biographies and documentaries. Through this dramatization of the reading texts, EFL learners are exposed to multimodal texts which allow them to 'see' and 'listen' to these texts, enhancing in this way their understanding.
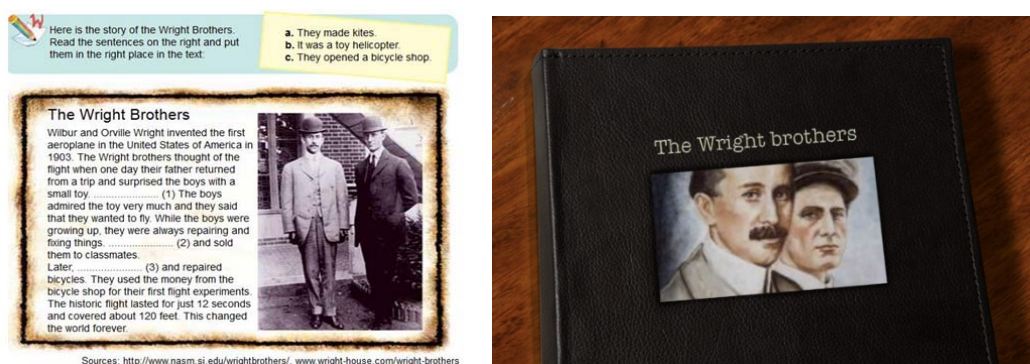
Figures 25-26: A text on the Wright Brothers as it appears on the EFL textbook (left) has been turned into a digital story (right)

4.4 Exploratory materials

Exploratory materials have a more focused orientation than experiential materials, in that they aim to help learners make discoveries about the language. They have been the most demanding and complex to produce digital materials both in terms of content and multimedia design. These include the 'mystery' and 'lost' series applications, English quests and writing apps. The first two involve learners in some kind of problem solving through a scenario-based problem to be solved (in the case of the 'mystery' and 'lost' series) or through a project-based task (in English quests). The writing applications guide learners through modeling and scaffolding to explore a writing genre.

4.4.1 'Mystery' and 'Lost' series

A type of exploratory digital materials produced by our group involves learners in some kind of mystery to be explored. These applications are scenario based and they are related to specific texts or activities from the EFL textbooks. In one of these applications, for instance, Sherlock is called upon to find a thief who stole a famous painting from a museum. In order to solve the mystery learners should decode a hidden message by a blind witness who heard the thief, follow the clues to find the thief and get back the painting. To do so they have to

use the Braille code (Figures 27-28). These multimedia applications use text, audio instructions, visual images and videos.

Figures 27-28: Screenshots from the 'Break the code'

In addition to the mystery series, we also developed a 'Lost' series with different episodes. In one of them, the 'Time Capsule', a robot from another planet who travels in time has collected a number of objects from his trips to Earth and needs some help to connect these objects with the correct time periods. EFL learners travel through time and put these objects (e.g. a cowboy hat, the first personal computer, a Greek amphora, an Egyptian papyrus, etc.) on a timeline. Although they are related to specific parts of the textbooks, these applications could also function as independent learning objects and can therefore be used in other educational contexts as well.


Figures 29-30: Screenshots from the 'Time capsule' application

4.4.2 English Quests

Another type of digital enrichment that falls into the category of exploratory materials are the English Quests. The idea behind this type of enrichment has been the digitization of the projects included in the EFL textbooks along the lines of webquests (Barros & Carvalho, 2007; Simina & Hamel, 2005; Thaver, Heng & Lim, 2003). Similarly to webquests, the

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suggested projects in the textbooks quite often use internet resources inviting learners to search through the web links, assess a given problem, collect and analyze information about it from different sources and finally synthesize a response of some kind by creating a final on- or off-line project.
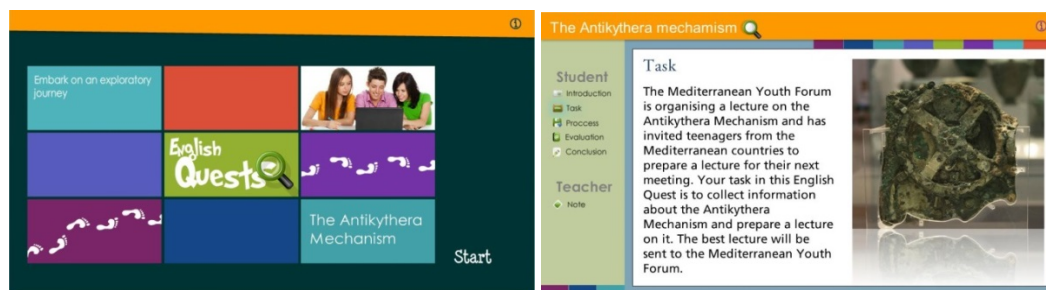
Figures 31-32: The first page of an English Quest application (left) and the main menu (left) (from Think Teen! 2nd Grade of Junior High School, Beginners)

Each English Quest focuses on a specific theme and it is based on the description of the project work included in the students' book as well as the detailed instructions included in the teachers' book. Evaluation charts for self-assessment have also been prepared for each one of the English quests. Following the categories of a webquest, an English Quest consists of the following parts:

Introduction	it sets the context and provides some background information
Task	it describes the final product that has to be completed by the end of the project
Process	it outlines the specific steps learners should follow to complete the assigned task and offers a list of online resources for learners to find relevant information for the completion of the assigned task
Evaluation	it includes an evaluation chart for learners to measure their performance
Conclusion	it reminds learners about what they have learnt and encourages them to extend the experience to other domains
Teacher Instructions	it offers teachers guidelines about the different stages of the quest.

This inquiry-based application puts together information about a project found in the EFL textbooks and through its menu it provides a scaffolding learning structure which promotes learning in context (Laborda, 2009).
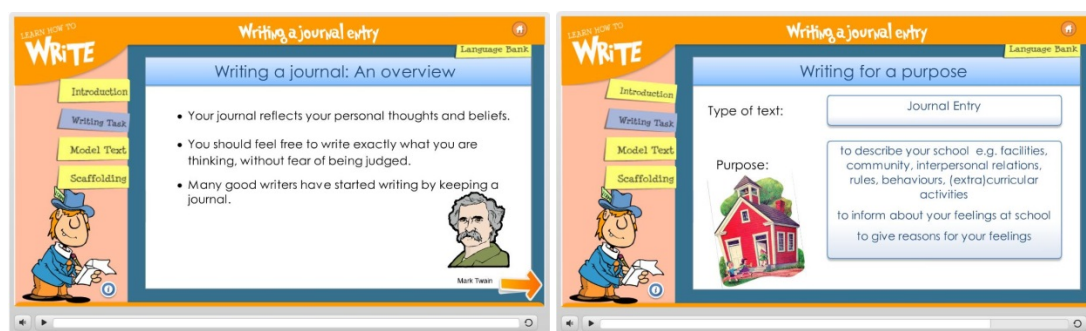
4.4.3 Writing apps

Writing apps is the most demanding type of enrichment, both in terms of content and multimedia design, developed during the third year of the project for the writing tasks of junior high school EFL textbooks. The aim of these applications is to guide EFL learners in every step of the writing process through a genre-based approach to writing instruction (Martin, 1999; Rothery, 1996) which places emphasis on the communicative context of the writing task, on analysis of a model to illustrate appropriate organizational and language

choices and on scaffolding, a process whereby the writing task is prepared following a step-by-step procedure.

After an analysis of all writing tasks included in the Think Teen! textbooks, twelve writing tasks were selected as representative of different writing genres that EFL learners should master. These include genres such as article, report, narrative, biography, description, mediation, journal entry, poster, CV, application and advice letter. Taking into account related literature, learners' level and exposure to the English language, as well as the pedagogy of genre-based and process writing that was selected by the textbook authors, for our applications we decided on a pedagogical model that consists of the following parts:

Introduction	it introduces EFL learners to the genre they are asked to produce and the general theme they will deal with in the writing app
Writing task	it presents the specific writing task and an analysis of the communicative context of the task: who writes, what to whom and for what purpose
Model text	it analyzes a model text on the same genre in terms of organizational patterns (what is included in the introduction, main body and conclusion) and lexicogrammatical features in order to illustrate the writing style of the specific text (formal, semi-formal, informal, chatty, etc)
Scaffolding	it provides a step-by-step guide to help learners construct their own text
Language Bank	it offers some examples of lexis and grammar that would be useful for the specific task.

The content of each writing app was first prepared in a storyboard consisting of two parts: what is to be shown on the screen and what to be heard during the application. Taking into account learners' age and level we decided to present information in English and to have a voice over in Greek explaining what learners have to do in their task and elaborating on the presented materials. It was considered that the use of the Greek language would make the application friendlier and at the same time it would help develop learners' interlanguage awareness. A computer generated voice over was selected both for convenience purposes and for adding a playful tone in the application. Overall, this type of digital application, as Derewianka (2003) notes, facilitates writing through modelling the genre, demonstrates the writing process, facilitates brainstorming and guides learners through drafting and revising.

Figures 33-34: Screenshots from a writing app on journal entry

5. Conclusion

The aim of the paper has been to provide an overview of the work conducted by the English Language Group of the Digital School Project within a period of three years in our attempt to enrich Greek State EFL textbooks with digital materials. To our knowledge this has been the most extensive project at a European level to attempt digital enrichment of the textbooks used in all school subjects. It is therefore important to outline the principles adopted in the design of the digital enrichment and to present the rationale of the different types of materials. The digital enrichment of the EFL textbooks, as we have seen, addresses different aspects of the EFL curriculum and covers a variety of materials, including *informative*, *instructional*, *experiential* and *exploratory* digital materials. For the implementation of these materials a number of different tools and software were used, such as software for video production, comics maker software, presentation software, online tools for infographics, an online database for the glossaries, flash engines, online puzzle and quiz makers, etc. It is true that rapid technological changes may make digital resources ephemeral. However, by placing emphasis on pedagogical principles and criteria and by adopting a principled approach to digital enrichment, we wanted to ensure that this attempt is characterized by pedagogical consistency and relevance for the Greek EFL classroom.

The perspective adopted in this paper is that of the materials development group. Future empirical studies will need to explore the effects of these materials on language learning and their "actual communicative effectiveness" (Tomlinson, 2012, p. 146), compare the effects of different types of materials which aim to achieve the same objectives, and investigate the impact of the different modes and media employed in these materials (e.g. by comparing the impact of materials delivered through digital and print media). Taking into account the complex relation between print textbooks and digital materials (Bruillard, 2007), future research should also explore the ways in which digital enrichment materials relate to the digitized EFL textbooks. Moreover, it should be considered that any research on digital textbooks and digital materials is inevitably multidisciplinary involving analysis of the ways multimedia and hypermedia design interacts with content development and new pedagogies in this complex communicative context (Mitsikopoulou, 2013). Most importantly, we should keep in mind that the new types of modalities used in the digital EFL textbooks which are delivered through an open online platform expose students to new ways of meaning making and new ways of learning.

Notes

1. The members of the English Group are the following (in alphabetical order): Eleni Argyriou, Giannis Bitros, Antigone Bratsoli, Mary Frentzou, Giouli Gyftoula, Vassilis Hartzoulakis, Katerina Makri, Susan Moutsouroufis, Sophia Mysirlaki, Katerina Nicolaki, Dimitris Paras, Chryssanthe Sotiriou and Linos Viglas.
2. Localization may take different forms. In the case of international publications, for instance, localization of materials may refer to its modification in order to reflect local issues and content. This is not the case though with the Greek EFL textbooks, which have been particularly designed by local authors specifically for the Greek EFL context.
3. This observation is attributed to Dr. Katerina Makri, a member of the English Group, who first made this insightful comment.

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4. See, for instance, http://quickshout.blogspot.gr/2013/04/exploiting-infographics-for-elt.html and http://www.livebinders.com/play/play?id=412294 (both accessed 3 March 2014).

5. The members of the English Group would like to thank interactional designer George Piskopanis for his valuable help and the high quality graphics that he prepared for this and the other types of digital enrichment (picture dictionaries, webquests and writing apps).

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