

Building a Moodle front-end for Greek language learning

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Abstract

Learning Management System (LMS) environments can be powerful tools in education, especially when they are combined with core learning principles, and principles of interactivity and adaptivity. In the case of Greek language learning, e-learning environments need substantial improvements in order to provide effective solutions to the end user. This paper aims to describe an e-learning environment that is being developed for the learning of the Greek language.

This environment is an interdisciplinary effort and is designed to provide an effective solution to the end user. By following the latest research directions, the working teams have been developing high quality digital content (animations, multimedia content, HTML pages enriched with graphics, etc.) that is being categorized with respect to the users' expectations, characteristics, and knowledge. The environment uses the Moodle LMS in order to exploit the features of courses, quizzes, user tracking, and tools of collaboration and communication. Moreover, new Moodle features are created, or extended in order to fulfill the Greek language learners' educational needs. For the same purpose, the Moodle embedded representation of content as lists of resources is being encapsulated through a graphically enriched navigation system. The material is thus presented to the user in a flow that is educationally documented.

Keywords

Adaptive e-learning systems, Moodle LMS, Greek language learning, efficient e-learning

1. Introduction

Nowadays Learning Management Systems (LMS) are a powerful tool in the educational process, as they support web-based context courses and quizzes, along with tools for communication and collaboration. One of the most widely used LMS systems is Moodle (Modular Object Oriented Developmental Learning Environment LMS) (Despotovic-Zrakic, Markovic, Bogdanovic, Barac, Krco, 2012). Concerning the use of LMSs in education, and language learning in particular, the literature highlights the need for developing effective e-learning environments by using pedagogical and design principles (Liu, Moore, Graham, Lee, 2002). An effective e-learning environment can be built when we have a clear comprehension of the features provided by current technologies, a set of well-defined and documented goals (Zhao, 1996), as well as a combination of core learning principles with Course Management System (CMS) tools (Carmean, Haefner, 2002) which basically are a more general type

of LMSs. These ideas are taken a little bit further by Despotovic-Zrakic et al. (2012) who suggest that adaptive e-learning environments which take into account a group's characteristics, expectations, knowledge, and preferences will constitute a new generation of the e-learning system.

With respect to the needs and principles described above, our team has started the development of an e-learning environment that will be used for the Greek language learning. This paper describes this system in detail and is organized as follows: Section 2 provides a quick overview of the environments for Greek language learning, and analyses their features in terms of the needs that are highlighted through current literature. A description of the proposed e-learning environment, already under construction, follows next. It is also explained how this environment fulfills general e-learning environments' requirements. Section 3 outlines the system's architecture, and Section 4 describes the development process that is being followed. Section 5 presents and discusses some system screenshots. Finally, Section 6 summarizes the environment's key points and outlines our intentions for future work.

2. Related work

A quick Web search on "web based language learning" results in a list of several platforms and websites that support different languages. Thus, it was necessary to focus the search on "web based Greek language learning" as it brings the results closer to the system we are building. A quick overview of the first five systems that resulted by searching on Google Search TM follows.

Learn Greek: This website provides a collection of resources that contribute to the study of Greek Language, in three different knowledge levels, as well as extra material for grammar and vocabulary. Despite the variety of content, the website provides the material as a list of resources, through a simple user interface. Moreover the material does not exploit modern ICT technologies by providing either interactivity or feedback to the user.

BBC – Languages – Greek: All you need to start learning Greek: BBC Languages provides a pleasant user interface, even though the material organization is a bit unstructured and confusing. The main aim of this site is to provide travelers with the basic knowledge of a language, by using a wide variety of multimedia resources, including audio recordings of dialogues, and videos. The environment is static for all users as there is no option of registering.

Learn Greek Online!: Learn Greek Online is constructed by using the Moodle TM Learning Management System (LMS). Its content constitutes of real audio files, online student notes, and a collection of collaborative learning tools, Greek online dictionary, and a Greek spell checker. "Learn Greek Online" benefits from the Moodle organization of resources as well as the existing - simple user interface and navigation methods. Therefore, it could be characterized as a large collection of resources enriched with interactive online features such as forums, online notes, and quizzes. This environment benefits from the use of the Moodle LMS, for user registration and tracking. However the solution does not provide a user friendly navigation system through the material. As a result the user has to encounter large lists of resources and spend a lot of time, in order to discover the resource that will cover his needs.

Learn Greek Online – Modern Greek language lessons: "I Learn Greek.com" is a commercial platform for learning the Greek Language. This constraint made it more difficult to explore the material in detail, but a "preview" feature offered a way of having a quick overview. This solution also provides a collection of resources, such as interactive games. Although the solution offers a registration method, it is mostly used for charging a registration fee and not for user tracking or personalization.

Filoglossia, ILSP: This solution is essentially a web edition of a subtotal of the filoglossia+ CD- ROMS. The content of the CD- ROMs is transferred to the web as static resources or simple interactive exercises that do not however keep track of the user or adapt to the user. The environment is presented with a very simple, static interface. There is no user registration in this solution either.

As one continues searching, one realizes that user friendly, adaptive and accessible environments are rare. This impression is also confirmed by research conducted for the European Commission and reported in "International Web- based Language learning on the Internet". This research provides an overview of international, commercial and noncommercial language learning course providers, and it concludes that most are usually just a collection of language study material with no associated grammar and vocabulary exercises. However, in the research literature, it is often argued that an educational environment has to contain two features: interactivity and adaptivity (Brusilovsky, Schwarz, Weber, 1996; Stern, Woolf, Kurose, 1997; Stern, Woolf, 1998).

Furthermore, research by Kukulska-Hulme and Shield (2004) focuses on the need to maintain the principles of pedagogical usability, intercultural usability and website evaluation while building a language learning environment. The writers also emphasize the importance of the end-user experience in terms of end user feedback, suitably linked resources with learning support tools, and user feedback. The web-based environments described above maintain a small subtotal of these requirements; therefore, there is a need for implementing an e-learning environment for Greek language learning that fulfills the requirements described above.

Adaptivity is a complex concept that could be analyzed in much detail. For the purposes of this paper the Brusilovsky (1998) definition is used. Brusilovsky (1998) defines Adaptive Hypermedia Systems as:

All hypertext and hypermedia systems which reflect some features of the use in the user model and apply this model to adapt various aspects of the system to the user. In other words, the system should have a user model, and it should be able to adapt the hypermedia using this model (i.e. the same system can look different to the users with different models) (p. 2.).

Guided by the principles of adaptivity and interaction we have started designing and implementing a large-scale Web Based Learning Environment for the Greek Language that is targeted to be used by teachers and students worldwide. Online learning management systems (LMSs) are a useful tool when building large scale environments, as they can reduce the costs and time needed (Naidu,2003). So it was decided that using an LMS as the core of our system, would benefit the project. There are many LMSs available: Blackboard TM, FirstClass TM, Moodle TM, Lotus Learning Space TM (Naidu, 2003). Out of the LMSs mentioned above, Moodle was selected to be the core of our system. Moodle is a free, Open Source LMS with a huge worldwide community that develops and supports it. The fact that Moodle is Open Source makes it possible to contribute with our own additions to its code, and preserve the hope that in the future, there will be an Open Source “sub-community” that will support the learning of the Greek Language. Last but not least, Moodle will save a lot of cost and time for our project as it provides a satisfactory percentage of the needed functionality. Additionally to the Moodle structure and functionality, our environment encapsulates the representation of the resources collection lists in a front – end, which is a user friendly navigation system. This design guides the user to navigate through the resources by using a predefined sequence of text and exercises, for each learning target that the user wants to achieve.

In terms of adaptivity to the user’s level and abilities, the resources have been categorized in two levels of language knowledge in conformance to the EU defined levels of language knowledge (Council of Europe, 2001). More particularly, the Council of Europe (2001) defines the levels of Level A: Basic User (A1, A2), Level B: Independent User (B1, B2), and Proficient User (C1, C2). As our system’s target users are students in the school age, the context covers the knowledge levels of Basic and Independent Users. Each level of knowledge consists of text sections and exercises. The text sections are an enriched context that contains a lot of interactive features, such as flash animations, real audio files, grammar explanations, dictionaries, video, photo galleries, and help. Exercises are mainly implemented by Moodle question types and plug-ins, although we have extended these with others tailored to the specific needs of the Greek language learners. The adaptive part of exercises is that the user can navigate to easier or more difficult exercises of the same knowledge level. In addition, it benefits from the Moodle LMS embedded user tracking in order to provide feedback to the user, and hold statistics for each student’s quiz attempts. The system’s context also takes into account the users’ age. Assuming that the language knowledge advances accordingly to age, the context of the first language knowledge level contains more interactive material that focuses on the teaching of simple key phrases. In contrast, the remaining knowledge levels have increasing difficulty, and their context concerns teaching more complex phenomena.

3. System Architecture

This section analyzes the system architecture in more detail, by describing the ways that Moodle is combined with the components we develop, in order to make a complete solution. More specifically, Moodle core components and plug-ins are used as a back-end system, which is encapsulated by a front- end system. The front-end system is partially using existing Moodle components, and the rest is developed by our team. At this point it should be mentioned that this approach raises many technical issues, that mostly stem from the need to adapt the front-end components (interactive games, graphics, animation, etc.), to the Moodle back-end structure requirements.

Figure 1 shows the front-end components, while Figure 2 shows the back-end’s architecture:

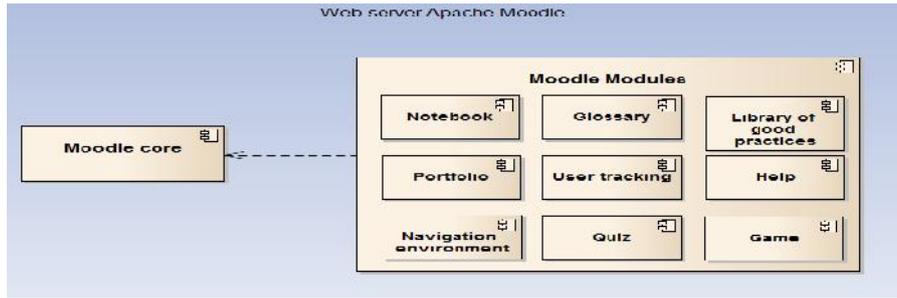


Figure 1: Architecture of the additional front-end components

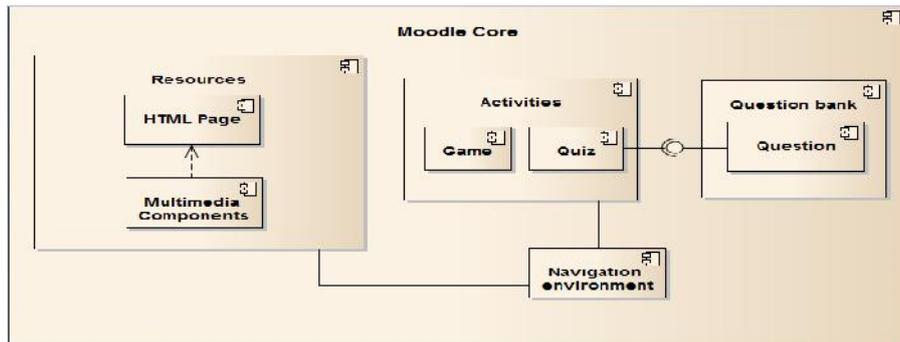


Figure 2: Moodle Architecture in detail

More particularly, the components that are used can be analyzed as follow:

- Navigation environment: There is no plug-in available in Moodle; our team develops it entirely.
- Notebook: There is no plug-in available in Moodle; our team develops it entirely and adapts it to the project's needs.
- Glossary: There is plug-in available in Moodle; our team adapts them to the project's needs.
- Library of good practices: There is no plug-in available in Moodle; our team develops it entirely and adapts it to the project's needs.
- Portfolio: There is a plug-in available in Moodle. Our team adapts it to the project's needs.
- User tracking: There is plug-in available in Moodle. Our team adapts it to the project's needs.
- Help: There is no plug-in available in Moodle; our team develops it entirely and adapts it to the project's needs.
- Resources: web material is being developed and placed to the environment by our team in collaboration with the graphics team, the team of content development, and the team of pedagogical design. Resources are pages, text files, sound files, video files, animation files, etc. Also learning objects might be used in future editions.
- Activities: web material that is being developed and placed to the environment by our team in collaboration with the graphics team, the team of content development, and the team of pedagogical design. Activities are interactive material, which consists of games, quizzes, etc. We should highlight here, that quizzes are questionnaires that are used to group Moodle question bank's elements.
- Question bank – Questions: Some question types are available in Moodle, while others were found in plug-ins. Question types functionality has been adapted by our team according to the project's needs.

Figure 3 shows the flow chart that a student will follow when using the e-learning environment.

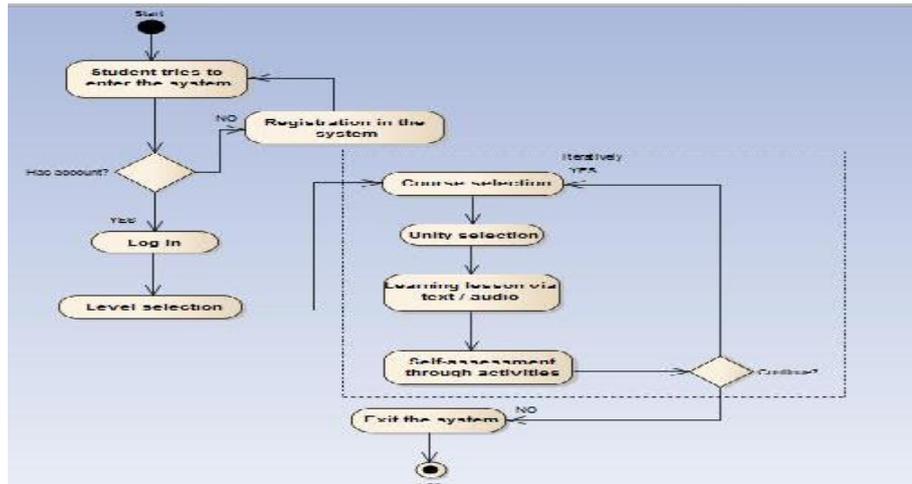


Figure 3: E-learning system Use Case Model

4. Development Process

Modern software projects require an interdisciplinary cooperation of teams with different expertise and skills that may or may not be related to Information Technologies (Jaccheri, Sindre, 2007). This project follows that approach. There are several teams involved in the project: teams for content generation (different teams for different teaching modules, such as language, history and civilization, and different knowledge levels), the team of pedagogical design, the graphics team, and the team of technological design. Each team has a supervisor, who is also responsible for the coordination between teams, under the guidance of the project coordinator. Because of the interdisciplinary nature of the project (linguists, pedagogues, historians and computer scientists are working together), and the fact that each team has a different domain of discourse and expertise, communication is not an easy task. It requires full understanding of each team's roles, and total devotion and interactive effort. Moreover, we have had to agree on a project management plan, in order to be effective and successful.

The project has a timeline that is divided into "lifecycles" that correspond to the content unities. Each lifecycle has six phases:

1. *Preparing the content:* In this phase the content teams generate the content. Then the content teams cooperate with the pedagogical design team in order to make the first user interface mockups, and define the user requirements. Then the team of pedagogical design discusses the requirements with the graphics team and they both decide the final mockups.
2. *Preparing graphics and sound files:* The graphics team generates the graphic and sound files, which are sent to the technological design team as fully functional HTML templates, and .ogg files.
3. *Preparing the environment, and importing the content, resources, graphics and sound files:* When the technological team has received enough material, they start integrating it into the environment. The technological team also alters the Moodle core or adds features in order to cover the specified user requirements in terms of functionality.
4. *Content team and pedagogical design team make alterations:* Content and pedagogical design teams review the system carefully. They contact the graphics team, and the technological design team to discuss the proposed changes. This action essentially is the repetition of phases 1-3. However, the system version is almost final, and phases 1-3 are quicker than the first time.
5. *Technological design and graphics teams update the system according to alterations:* The graphics team makes the relevant alterations and submits the new files to the technological design team. The technological design team integrates the updates to the system. During the project development, phase 4 may be repeated some times until all the teams are satisfied with the result. However, this procedure stops when specific deadlines are met.
6. *Feedback from teachers:* When the first beta edition is ready, it is released to selected "testing" schools from all around the world. Teachers from these schools have already had some training sessions and they have seen demos during the development phases. So they have specific expectations of the project. The teachers

will give their opinion through questionnaires that will then be analyzed in order to decide for the final changes that will be integrated in the first beta release.

7. *Release beta edition & final edition of the project:* When the final alterations are finished, the first beta edition will be released. However the schools will continue giving feedback and the teams will continue working in order to make the final edition of the project, and release it one year after the release of the first beta edition.

Figure 4 shows an activity diagram of the development process described above.

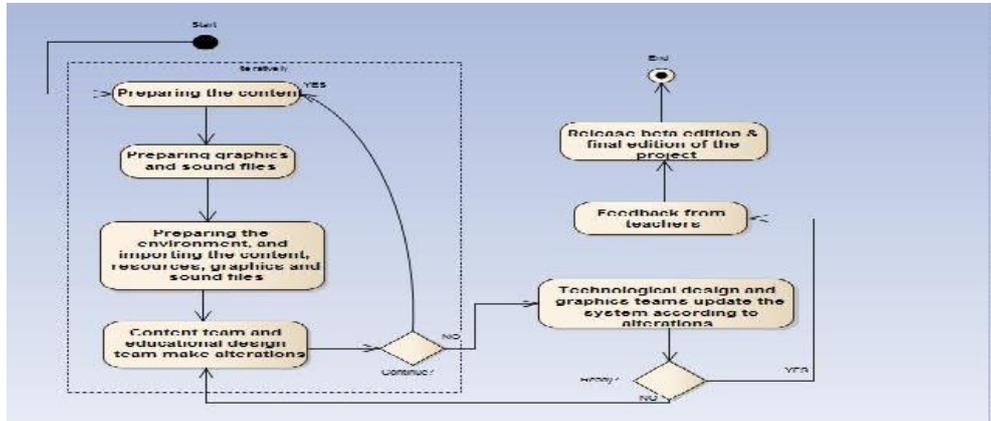


Figure 4: Activity diagram of the development process

5. Environment overview

The implementation of the environment described above has already started in a form of beta edition. This section provides some screenshots of the system. Figure 5 shows the first screen through which the user chooses a knowledge level to practice on.



Figure 5: Navigation System – Choosing the knowledge level

Figure 6 shows the screen that follows the knowledge level selection. In this screen the user chooses the course he would like to be trained with.



Figure 6: Navigation System – Choosing the course

Figure 7 presents a text enriched with hypermedia elements (blue words are links to pop-up windows as the one depicted at the right of the screen), audio (audio player at the right bottom of the page), and photo galleries (the user may switch the pictures by using the play button at the right bottom of the gallery).

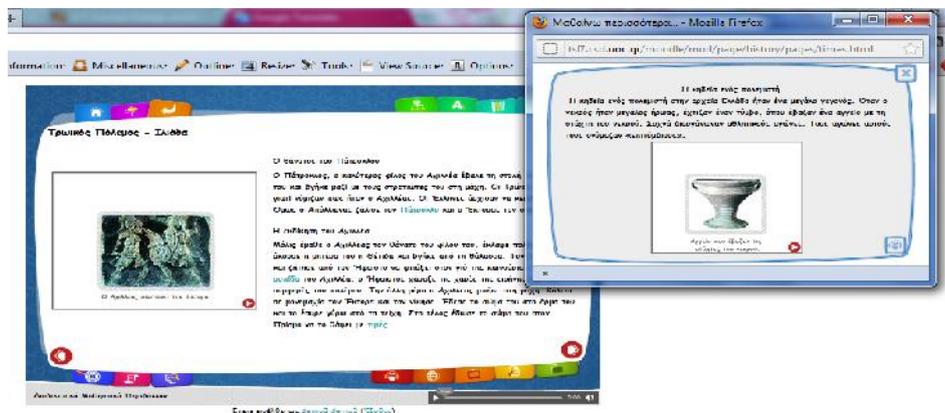


Figure 7: Learning via hypermedia and multimedia enriched text

Figure 8 presents an interactive drag and drop exercise for A1 knowledge level. At the end of the exercise the user gets feedback. The menu at the right part of the screen gives the user the possibility to navigate through exercises that are either easier, at the same level or more difficult. The difficulty of the exercise is depicted by the stars at the right top of the page (1/3 levels of difficulty, so only one star is pink).



Figure 8: Drag and Drop exercise for A1 knowledge level

6. Conclusions and future work

In this paper we have described an e-learning environment which concerns the learning of Greek as a second foreign language. As LMSs are capable of saving cost and time for e-learning projects, our system also uses Moodle LMS for its base. However, the Moodle code is being extended and tailored according to the Greek language learners' needs. In order to fulfill the learner's needs in an optimized way one has to respect core learning principles, as well as the current research guidelines that suggest adaptive and interactive environments.

Consequently, this project is an interdisciplinary effort for developing an educationally documented environment. The content is the product of specialized content teams' efforts, while the environment is being designed by the educational design and graphics teams, and built by the technological design team. The final e-learning environment is comprised of courses, quizzes, user tracking, user feedback, animations, and multimedia elements that are being categorized accordingly to the user's language knowledge level. Although the total or a subset of the above elements is met in existing Greek language learning environments, the hallmark difference of our system is the user friendly navigation environment that encapsulates the LMS's list of resources and guides the user according to specific goals and needs, as well as the content's adaptivity to the user's language knowledge level.

The environment described above is still under construction which means that our team intends to continue enriching the platform with extra content, and new features, or adapting the existing features to the project's needs. These plans also include the integration of an interactive teacher – student environment, and the creation of learning-communities within which the participant schools will be able to communicate, exchange ideas, and participate in collaborative projects. When a beta release of the e-learning environment is ready, it will be evaluated by teachers and students from schools that will be using the environment. The ultimate goal is to optimize the e-learning environment, and enable the system to support the creation of worldwide learning communities for the Greek language.

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