

A review of GrfKids: Development of a Greek language teaching platform via a Learning Management System for primary school pupils with Russian as a mother tongue

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INTRODUCTION

It is generally accepted that within a globalized society in which the use of foreign languages has increased, foreign languages are a prerequisite for communication (Mehisto, 2012). Moreover, proficiency in more than one language can enrich academic and life experiences, whereas it can also provide the necessary qualifications for personal and career advancement. Teaching a second /foreign language, as well second language acquisition has always been characterized by searching for new effective ways of teaching/learning a new language on the one hand and the adaption of new methods and approaches on the other. Thus, foreign language education entails a variety of methods and approaches aiming at fulfilling the various learners' needs, as well as making learning process more permanent and effective (Simsek and Bakir, 2019) and (Wang, 2017). Each approach or method can be distinguished by its theory and sets of principles as to how language is best taught and learned (Czasny, 2019).

Over the past years the use of computers has enhanced teaching and learning a second/foreign language entailing a variety of benefits, such as increasing students' attention to the subject area, creating incentives to improve writing, etc. (Blake, 2013). In a knowledge society in which information is transmitted over the Internet at a rapid speed, the school has to prepare pupils as the citizens of tomorrow to join this new social model (Ackermann and Hartman, 2014), (Caladine, 2008), (Welsh et al., 2003), (Sampurna et al., 2018), (Caruso et al., 2019) and (Ma, 2019). In the new generation of the Web (Web 2.0), users interact, collaborate and shape the content of web pages. Nowadays, a user can

learn everything on the internet, i.e. from solving a query to adding qualifications to a CV. The main advantage of this constant flow of information and knowledge is the support of independent work and individualization in language learning (Alexander, 2006).

Within this framework several online platforms, either free or pay ones, are available for second/foreign language learning. However, most of them are, either static pages or with a question/answer format lacking a full description of every module. Furthermore, whereas Greek language teaching is widespread, there is no specific educational content management system for teaching Greek language to children with Russian as a mother tongue. In the meantime, some of the best-known learning platforms for Greek language learning are : a) Duolingo, a language learning platform allowing the user to choose the language he/she wants to learn at his/her own pace, while he/she can also contribute to the expansion of the curriculum (Duolingosupport, 2019). b) Loecsen, a language learning system involving audiovisual educational material, which, however, is not interactive (Loecsen, 2019). c) IlearnGreek.com, a Greek language learning website involving text reading and audio material (IlearnGreek, 2019).

Because of the massive mobility of migrants/refugees within the region of Europe in recent years, Greece as a member of the EU has had to take measures in order to face the smooth integration of migrants/refugees and their families into their new societies catering among others for intercultural education (Adami, 2008) and (Androulakis et. al., 2016) . Russian migrants are usually economic immigrants, who have often settled with their families in different areas of Greece. Upon relocation, their children are called to join school and learn the new language in order to become active members of the school community. Therefore, they need a constant contact with Greek language, even in the form of a game, usually without the supervision of a Greek-speaking parent or a Greek language teacher. Taking into account all the above mentioned, this study presents the "GrfKids" application, accessible online (<http://www.greekforkids.org>), which can be used in a real class context, or as a support material for the teacher himself/herself. The application aims at fulfilling the Russian tourists visiting Greece communication needs, as well as helping Russian economic migrants' children learn Greek without the support of an adult/ Greek language speaker. The platform was developed in WordPress, an open-source content management system based on PHP and MySQL, allowing to upload and manage web content on the web (Avgeriou et al., 2003), (Powers, 2019) and (Schwartz et al., 2012). It has many features including a plugin architecture and a template system. Wordpress is among the most popular systems in use on the Internet since it can ensure security and easy-to-use programming software both for developers and website administrators. WordPress plugins provide additional functions (Hrastinski, 2008), and are used in Learning Management Systems (Lonn and Teasley, 2009) that supply organized training material in a structured format and formed courses in an evolutionary format, usually created with web tools. A number of application results using other open-source programming languages such as PHP and MySQL can be found in (Fragulis et al., 2018), (Lazaridis et al., 2019), (Skordas et al., 2014) and (Skordas et al., 2017) and the references therein. For image, animation and video editing there were used: a) Adobe Photoshop, an image editing program; b) Adobe Flash, now called Animate for animation, multimedia, applications, mobile games, and c) Adobe Premiere for video editing.

CHARACTERISTICS OF THE PROPOSED WEB PLATFORM

The present study aims not only at teaching a new language but also at building a learning content management system on the WordPress platform that will serve this particular purpose. More specifically, WordPress plugins can add the necessary extra features to a content management system in order to make it function as a standard learning management system. Thus, an integrated learning management system is developed, using not a ready-made platform, but technologies that can help the overall design of a website with educational content, which might be hosted on a shared hosting managed WordPress server without any additional requirements or costs for specialized hosting. More particularly, we could have used a ready-made LMS, such as Moodle, not requiring modifications to meet the specifications of a learning management system, as in the case of WordPress. However, it might require additional use and service costs for the teacher, apart from specialized installation and maintenance knowledge. Thus, we opted for WordPress which is offered for free by the Ministry of Education and can be used as a teaching supportive tool. (Coates et al. 2005) and (Lonn and Teasley, 2009). Finally, there is a consideration for a possible hosting of the application on a Raspberry Pi microcomputer system in order to provide application access locally via a wireless local area network.

Advantages of using Web Technologies in Education and Distance Learning

E-learning has completely changed the way courses are delivered, making learning more convenient, flexible and advantageous to students. E-learning has also changed the traditional role of teacher, who is called to facilitate the learning process by guiding, helping and motivating the learners, as well as teaching the strategies they need to select, access, evaluate, organize and store information. E-learning encourages independence and active involvement in the learning process. Resources are available to anyone having access from anywhere and at any time. It is cost effective when compared to conventional teaching, as the only expenses required are for platform building. Course material is frequently updated and can be modified to meet the learners' needs who can train themselves at their own pace instead of following the speed of the whole group (Daneshgar and Van Toorn, 2009), (Davis et. al., 2009), (Jung and Park, 2011) and (Shaffi and Al-Obaidy, 2013).

Unlike conventional teaching, with e-learning, the learner can access the content an unlimited number of times and choose to focus on specific areas of the learning material relevant to his/her needs. Discussion boards and chats can help interact with everyone online, exchange views and also clear doubts. E-learning may also enhance less motivated students to be engaged in the learning process, as they may find an on-line learning environment more interactive and interesting than that of a conventional classroom. Moreover, feelings of anxiety or insecurity concerning students' performance or oral speech production in the foreign language might be minimized in an online learning environment. Thus, students having control over their learning process are likely to feel more

confident and independent.

Teachers, on the other hand, with e-learning have the opportunity to monitor the learners' progress and detect their weaknesses and needs, due to permanent real time assessment information. By exploiting LMS possibilities they can develop their teaching material, which can be updated constantly, thus making the learning experience more exciting, enjoyable and enriching. Once the material, activities and content have been developed, they can save time to monitor the students' progress with an aim to meet the course objectives. Finally, this shift from teacher-centered to learner-centered approach in language learning and teaching has rendered the teacher a supporter and facilitator rather than an evaluator, who attempts to engage his/her students in the learning process more actively (Ayub et al. 2010), (Nichols, M., 2003), (Daneshgar, and Van Toorn, 2009), (Davis et. al,2009) and (Jung and Park, 2011).

Analysis of various issues during the development phase

The n-tier architecture was selected for system design (Manuel and AlGhamdi, (2003).), whereas the system development was based on the WebML methodology (Ceri 2000) and (Granada et al., 2017). In order to evaluate the usability, functionality, and effectiveness of the "GrfKids" Web application, a pilot application of the platform took place.

First the application was uploaded in a web server and the lessons were made available to the test-users. Then, the speed/response of the application was tested. The results were very satisfactory, as the application worked rather fast. After that, an account for every user type (Pupils /Teachers /Admins) was created. Users coming from different backgrounds (system developers, computer analysts, school teachers, Department of Primary Education researchers, Primary Education Universities students, and finally a group of newspaper/web-journalists) were tested, in an attempt to involve various categories of users with differences in age, level of education and occupation. The test-users feedback was taken into account and helped us improve several parts of the application. Specifically, during the alpha and beta test, the users pointed out that the functionality of the site, i.e. lessons, videos, and animation images, should be improved. All in all, the final version of the web system satisfied the majority of the test- users, more specifically, the changes of the front-end of the application, as well as the variety of information provided. Deliberately little or no information was provided to the test-users about the application of the web platform in order to test whether the platform is functional and easy to use, i.e., a number of pupils at home/ or in a classroom, or a group of tourists visiting Greece. However, the majority of the comments were positive and encouraging and the test-users found the application easy to handle and use. Finally, more than 70% of the participants stated that the most favourite categories of the information presented were the lessons, videos, and animation images.

Functional & non-Functional requirements

The functional requirements of the platform involve easy user registration, support of three types of users, i.e. the teacher, the pupils and the administrator and provision of tools to create and configure digital interactive educational content. Regarding the non-functional requirements we could argue that the platform is available online and can be supported by every operating system. Moreover, there is no age barrier and even very young children can use it. Also, it requires no installation and can be supported by mobile devices. Finally, it is aesthetically appealing.

User groups

The system diagram presented in Figure 1 describes the user groups of the platform. The first group is the "pupil", who can sign up, as well as participate in the courses in an interactive way at his/her own pace and get an automatic assessment. The second group is the "teacher", who can develop the educational material and monitor pupils participation and progress. The third group is the "administrator" who has full access to every part of the system and thus the ability to manage courses and users of the two groups above mentioned.

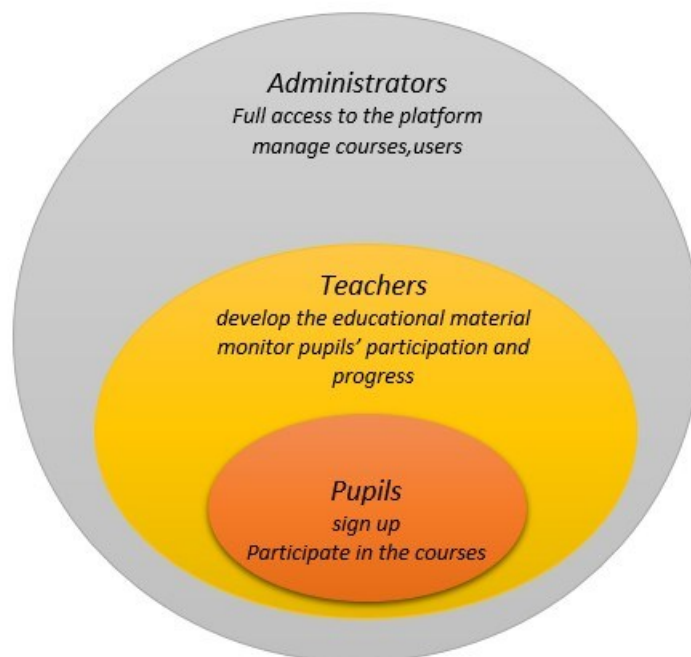


Figure 1: Flow diagram of the "GrfKids" system

Description of the system

For the deployment of the application, the Raspberry Pi (RPi) system was selected, a low-cost single-board computer. It was configured as a network server, in order to examine the effectiveness of the application in providing teaching via wireless local area network at areas without internet access and without the use of mobile networks, with only pre-requisite for the user a wireless network connection capable device with a browser program. Such environments may be the environment of a class or a tourist

information kiosk.

To create the content of the lessons, images were used for a better configuration of the learning material of the platform as a whole. These images were presented in a single format or per video group. For better results, it was necessary to use editing tools to format the graphic content including creation and/or editing of images, videos, and effects. Thus, Adobe Photoshop, Adobe Flash and Adobe Premiere were used for this purpose. More specifically, Photoshop for editing and customizing graphics in the teaching material of the platform. Graphics were adjusted for size, color, and background. Also, there was a combination of graphics to create a single image. Flash made the animation used in the videos. In addition, styles created writing effects and image motion on a fixed background. Finally, Premiere processed the videos that were used thus creating more dynamic content. The material resulting from image, animation, and video edits was used throughout the platform.

For a better appearance and functionality of the page, the web platform used Smart Slider3, Page Builder, Shop Page WP, and Wordpress Ultimate Member plugins.

The web application also used H5P, a free and open-source JavaScript-based framework that helps users create, share and reuse interactive HTML5 content (H5P, 2019). Based on this add-on, all platform modules can be formatted with multiple choice questions, right image selection, cards, memory games, and spelling. H5P is used in conjunction with xAPI to store data, as well as content transfer to another management system. xAPI was chosen because an in depth tracking of users' activity was required for an adaptation of learning material and improvement of learning process. xAPI offers reliable tracking, working on a wide range of devices and browsers, including the mobile ones (Lim, 2016).

Krashen's five hypotheses for Second Language Acquisition constituted the basis for syllabus design. Thus, in an attempt to meet our target audience needs, i.e. primary school children with Russian as a mother tongue, we designed teaching material that could help them acquire Greek language in a subconscious process very similar to the one they acquired their first language, i.e. Russian, instead of just learning it. (Acquisition /Learning Hypothesis). Learners will also have the opportunity to learn at their own pace and contribute to syllabus modification (Monitor hypothesis). Moreover, modules have been designed in an evolutionary format providing the learner comprehensible input, each time one step beyond his/her current stage of linguistic competence (natural order/ input hypothesis). Finally, a welcoming learner-centered environment has been created in order to motivate the learner, as well as making him/her feel safe, confident enough to make mistakes, take risks while learning the target language (Affective Filter hypothesis) (S. D. Krashen, 1981) and (S. Krashen, 1982). It should also be clarified that there is not a one-sided presentation of the educational material to the student, but one that aims at engaging him/her in speech production supporting the interpersonal interaction during the teaching/ learning a language process. There is an attempt therefore, to create a context in which communication/interaction can take place between a human and a PC/smart device, as in a real class context, where the student is required to apply his/ her linguistic abilities in oral or written speech when communicating with the teacher or other

students in order to achieve the purpose of each unit and his/her personal pursuits. More particularly, modules are accompanied by moving graphics with clickable, liberal use of multimedia, navigation extended to menus and links, high audio and video quality, with an aim to add variety and excitement to the lesson, hold the learner's attention and help them improve their language level in order to communicate in Greek confidently and effectively.

User Interface and Functionality

In this part, there is a detailed description of the "GrfKids" application interface and features available to the user.

According to Figure 2, the user with administrator/ teacher rights has the ability to customize the H5P plugin for modules configuration in order to format the way in which they are presented, such as multiple choice answers, selecting the correct image, memory and spelling games.

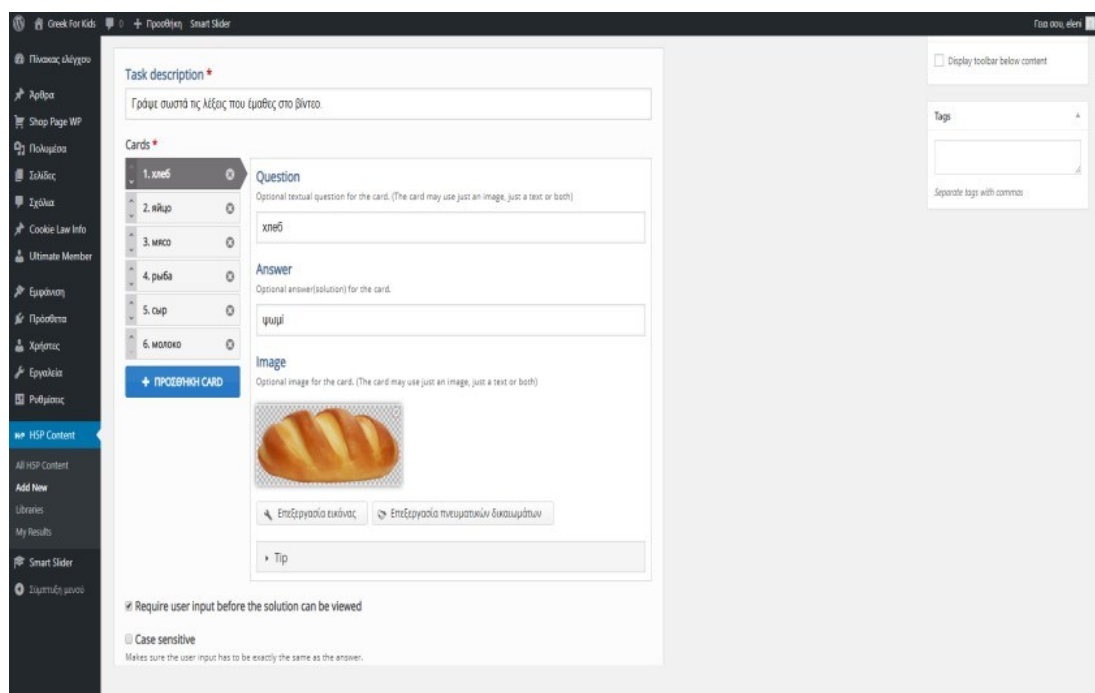


Figure 2: H5P add-on

The user can use the xAPI plugin together with H5P for data storage. This combination transfers and modifies files that are secured because it works not only through the platform itself but also within the H5P itself, where the files are kept and can be transferred if the content is transferred to other management systems. Shop Page WP is a plugin used to create, edit, and delete the course page.

As shown in Figure 3, Smart Slider 3 is the most powerful and intuitive WordPress plugin for settings that could not be done earlier. It is very easy to edit, compatible with SEO optimizations, as well as with most WordPress themes. In this case, it was used on the home screen and integrated with PHP.

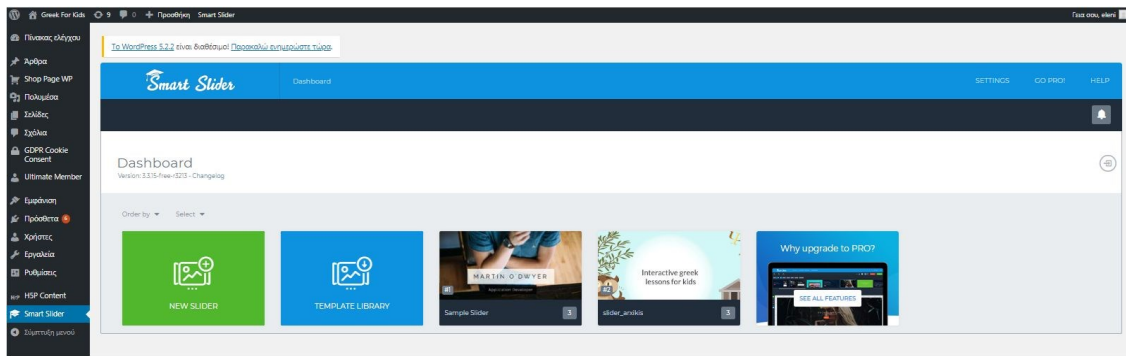


Figure 3: Using Smart Slider 3, for "GrfKids" home screen

Ultimate Member plugin is used for creating the users' profile and the addition of a new member to WordPress. This plugin is a handy choice for users to sign up and become a member of a website, while it also allows the addition of visible user profiles to the site. In addition, it is ideal for creating advanced online communities and access sites. It is functionally lightweight and very flexible and it also enables the creation of almost any kind of site, where users can sign up with great ease.

All the above tools are used for the LMS "Greek for kids" page development. Only the key points and not every step and detail of the development process have been presented here. What follows are descriptions concerning the users' visit to our page. All the functions, as it has been mentioned before, are in Russian, due to the purpose the platform was built for. Figure 4 shows the home page of the web application with the corresponding menus, i.e. 'lessons', 'sign up', 'about us' while the option for cookies acceptance is also displayed at the bottom of the screen.



Figure 4: "GrfKids" homepage

By selecting the lessons menu, icons representing each lesson are displayed. By selecting the button located at the bottom of each icon, the user is redirected to the corresponding lesson (Figure 5).

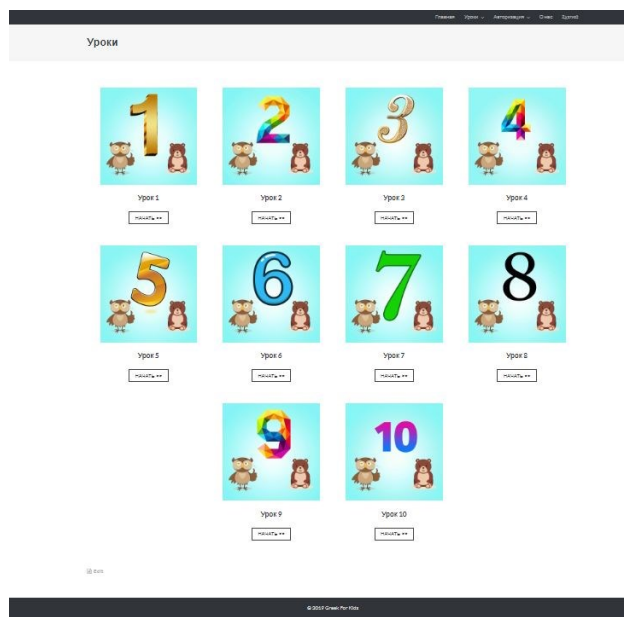


Figure 5: Web platform course options

In Figure 6 the first lesson is presented. There are images, videos, games, all embedded in a single application. At the bottom there is the option next, referring to the second lesson.

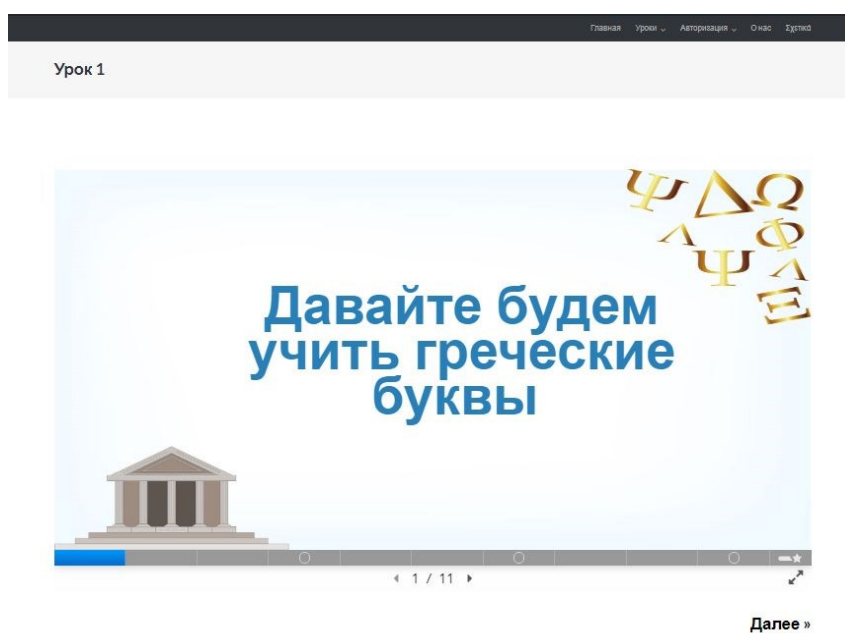


Figure 6: Display of the first Lesson

In the second lesson, there is an explanatory video which constituted the basis for the creation of two interactive games, i.e., matching similar objects and matching the correct answer in a context with active points. (Figure 7).

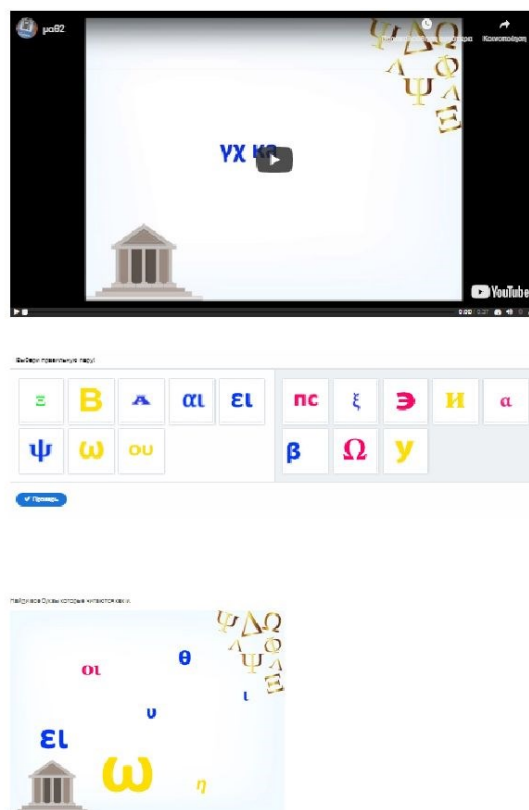


Figure 7: Lesson with an introductory video and interactive games

Lesson 3 is structured in a similar way as the previous one, the only difference being a spelling game of the words taught in the introductory video. In lesson 4, new words are taught through audio cards translated into Russian for a better understanding of the meaning. The exercises involved are spelling, true/false questions and multiple choice answers. In the fifth lesson, new vocabulary is taught in a similar way as before, while the exercises are also similar to the exercises of the previous lessons (Figure 8).

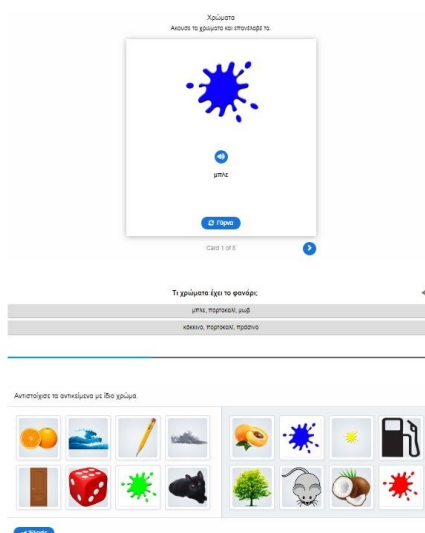


Figure 8: Lesson using audio cards

In lesson six, the seasons of the year are taught, as shown in the exercise above. By placing the cursor on the icon, there is also a change of the text. In the seventh lesson, apart from similar exercises to previous lessons, there is an exercise with memory cards, i.e., by turning similar cards upside down, the name of the

object is displayed. Lessons, eight, nine, and ten are structured in the same way as the previous ones with only the content being different each time.

Comparison of "GrfKids" with other Language Platforms- Discussion

A number of similar platforms (Duolingo, Loecsen and IlearnGreek.com for teaching/learning a foreign language) to "GrfKids" platform have been presented in the Introduction. As far as the similarities between the "GrfKids" platform and the above-mentioned ones are concerned, these are the following. "GrfKids" is free and provides learning modules configured by the teacher manager, in a similar way as Loecsen and IlearnGreek.com. It has interactive courses with an automatic assessment like Duolingo, whereas the learning modules are designed by the platform manager. However, it differs, as it is built in an open source philosophy, it has interactive lessons with a preceding video explaining each lesson and it is addressed to a specific target audience.

Benefits of the proposed system

"GrfKids" can provide an easy-to-use educational program for children with immediate access to courses with signing up. It is easy to use, functional and easily and immediately adapted to learners' linguistic, as well as age range. It provides interactive modules with an automatic assessment. The learners can adapt the learning time according to their needs. It was developed to create a teaching system by applying different plug ins to the selected CMS(Content Management system), aiming to achieve a curriculum in which the pupil is in direct interaction with the educational material. The curriculum has been designed on an evolutionary format with possibility to expand and enrich the existing material or add new. Finally, "GrfKids" can be used individually, or as a support tool in a real class context.

Limitations

Concerning the constraints of the present platform, it is questionable whether consistency will be maintained by the student in an out of the class environment, while the learning time cannot be defined accurately as well. However, a ten- day period may be set (for the existing material) provided that five minutes are given per day. Pupil data is recorded on the platform after signing up with the Ultimate member. Each lesson assessment results are recorded in the H5P add-on.

Conclusions

The study as a whole entails a combination of functionality and plugins, whereas research on the existing

technologies, how they work and respond to each other, has been made as well.

At first, the content of the syllabus was decided. Ritova's book "Ta Ellinika"(Greek Language) (Ritova, 1978) and (Ritova, 2004) was chosen as a source for the ten lessons created on the platform. However, it should be noted, that the teaching material was developed more concisely than in conventional teaching of a second language since the focus of the present study was rather on developing a learning management system than on teaching.

In order to teach the specific syllabus within the platform, several theoretical approaches were studied with Krashen's five Hypotheses of Second Language Acquisition (S. Krashen, 1982) and (S. D. Krashen, 1981) chosen as the most appropriate one. However, there is not a strict compliance with it, since it is rather used as a guidance and assistance for the smooth outcome of all content. This flexibility is due to the developments both in technologies and current educational practices.

To create the curriculum modules in the WordPress management system, the H5P plugin was used, approved by the Ministry of Education, Research and Lifelong Learning for the project "Digital School II Action 1" developed by the CTI "DIOPHANTUS". The H5P plugin is an appropriate and easy- to-use option for syllabus design involving a variety of choices that respond to most theoretical approaches for material development. After completing the curriculum configuration, the WordPress system was modified to the LMS specifications. For this purpose, several available plugins were tested. However, since some of them could not function properly in conjunction with the H5P plugin, this process proved to be quite complex. Finally, the Ultimate Member plugin was implemented, which with some modifications, could work for pupil signing up and platform use.

Future Research

The limits set in the research and the implementation of the study aim at a possible extension of the page and its application in a real class context. More particularly, further research could include expansion of the platform for teaching Greek to children native speakers of other languages besides Russian, i.e. Japanese, Chinese or Arabic. In addition, there could be application of the teaching material in its present form in a real class context and recording statistics for learning outcomes during e-learning and real class contexts. Also, the platform teaching material could be expanded, as the limited number of lessons only served the process at hand. Finally, the platform teaching material could be applied in a real class context using Raspberry Pi or any other smart device.

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