

Using Moodle in secondary education: A case study of the course “Research Project” in Greece

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ABSTRACT

“Research Project” is a new addition to the Greek educational system established in the 1st and 2nd year of high school, as a distinct course of the Curriculum. In this paper we study the use of the platform Moodle, in order to organize and implement this course. This use took place in the 2nd four-month period of the academic year 2012-2013. The students, apart from the weekly 2 hour long classes, had the chance to implement different parts of their project on Moodle. The main use of Moodle comprised the submission of written projects, the receipt of relevant feedback, the planning of the collaboration among students, the participation in open discussions for a better implementation of the course, and the registration of various data from the students total input to the group project. Using quantity and quality evaluation methods it was found that the students are able to familiarize with the platform and benefit from its incorporation to the educational process. The platform is still in use with improvements from the educational and technological point of view.

Keywords: Moodle; “Research Project”; ICT; Secondary Education; Education; Greece.

INTRODUCTION

Given that digital technologies are being more and more integrated in our everyday life, thus producing an on-going multiliterate world, teachers are trying to include them in classroom practice (Henderson 2011). Traditional teaching methods, with teachers in front of a blackboard giving long hours of lectures do not “work” with today’s students and certainly will not work with the students of tomorrow. By using ICT (Information and Communication Technologies) the teacher’s role is being transformed from a traditional profession to an intermediate supporter towards the facilitation of the students to conquer knowledge (Kalogiannakis 2010). King (1993) advocates the importance of the student to take a more active role rather than being passively taught. He presents active-learning techniques that teachers can use to help students construct knowledge (King 1993). Active learning is defined as the process of engaging students in activities in such a way that they are supported to reflect upon ideas and how these ideas are being executed (Michael 2006).

We live in an ICT dominant era and the opportunity students are having to learn, develop skills and critical thinking through ICT is clearly demonstrated through a series of policy initiatives over the last decade (Littleton & Whitelock 2005; Muttona et al. 2006). The integration of ICT as an educational tool should be considered as an approach of updating the learning and teaching procedure. This article reports on a small research that investigates the use of ICT in a course entitled “Research Project” (“Ereunitiki Ergasia” in Greek) introduced in the Greek secondary education. The course entitled “Research Project” is a new addition to the Greek educational system. The Greek Ministry of Education established this course in the 1st and 2nd year of high

school, as a distinct section of the Curriculum, which embodies the basic principles of the Greek New School. The incorporation of the “Research Projects” in the Greek educational system is a novelty since these projects contain:

“... the elements of active student engagement, choice, critical and creative thinking, as well as the connection of personal experience with school knowledge, and eventually, with real life situations...” (Matsaggouras et al. 2011, p.15).

Education policy in Greece is controlled by the Ministry of Education and Religious Affairs, from pre-school (Nipiagogeio) to upper high school (Lykeio) and higher education (University, Polytechnic University, School of Fine Arts). A free basic education of thirteen years is guaranteed by the constitution, a minimum of ten years' school attendance is mandatory. Basic education is divided into six years of primary education and six years of secondary education, the latter being further divided into three years of lower- and upper-secondary levels, respectively. Upper secondary is optional. Kindergarten levels of pre-primary education, also part of the basic education level, span 1 year.

The Institute of Educational Policy (IEP) was established in 2011. It is a Private Legal Entity supervised by the Minister of Education and Religious Affairs. It is a scientific body which supports the Ministry of Education and Religious Affairs, with main aim the scientific research and study of the issues related to primary and secondary education, as well as the transition from secondary to tertiary education, as well as the on-going scientific and technical support for the design and implementation of educational policy issues.

The first year in pre-school is for age group 4-5; primary level or Dimotiko, are for age groups 6–12; lower secondary level or Gymnasio, is for age groups 13–16. The upper secondary level of schooling or Lykeio are for age groups 16-18. After upper secondary school students need to pass National Tests to enter a university or other higher education institution. In secondary education students have to participate in local exams per school, in order to pass to the next level. There are no exams for primary or secondary students, to enter educational system. Only in specific schools, those are called Experimental Schools, students have to pass an entrance exam. The school year is divided to semesters, only in secondary education: three for lower- and two for upper-high school. School year starts in the beginning of September and ends in May for secondary and June for primary education. Last five years a reform has been conducted, about curriculum, structure of education and teachers' training. Because of economic crisis, nowadays there are plenty of problems in all level of education, especially of teachers employ.

The main goal of this work is to study the connection between the social constructivism theory and the student collaboration strategies, during the planning and the teaching of the course “Research Project” using Moodle. Moodle (Modular Object Oriented Dynamic Learning Environment) is a well-known Learning Management System (LMS) and it is different from a Content Management System (CMS) as it allows the direct access of the participants and their interaction. An LMS allows the users to access educational material and to interact implementing various tasks. Moodle developed by Martin Dougiamas and Peter Taylor, in 2001 (Dougiamas & Taylor 2002). In Australian slang Moodle means “to toss around an idea in your head for a while to look at different aspects of it” (Sánchez & Hueros 2010; Psycharis et al. 2013). According to the data available in the Moodle website (Moodle Statistics 2015), Moodle is used in 214 countries, with about 56 millions of active members. The incorporation of a Learning Management System, such as Moodle is a novelty for the Greek public education system, a fact that could be considered as a “novelty within a novelty”.

In order to design and develop a learning environment adequate for achieving the educational objectives, an interesting source of knowledge were the opinions of students, obtained through the platform user survey. The growth and development of ICT in Greece has placed responsibility

on educators to be informed about not only acquiring ICT skills and knowledge but, more importantly, to understand the pedagogical use of ICT in class practice. In the framework of this study we offer a non traditional high school course, like “Research Project”, through the web environment of e-learning that applies the principles of hybrid learning (Hughes 2007).

THEORETICAL CONTEXT

Moodle in Secondary Education

Previous research found the benefits from the use of Moodle in the secondary education (Kok 2008; Lu & Law 2011; White 2010). Moodle is not a content listing system, but mainly a learning system that enables the participants to learn through interaction, on the basis of the principles of social constructivism (Palinscar 1998). Therefore, each team member learns from the rest of the participants and each reference to the team receives a pedagogical – teaching value, since it may be absorbed by the other members as a newly acquired body of knowledge (Moodle Statistics 2015).

Social interactions that improve the motivation to learn and advance the educational process take place within the Moodle platform. Moodle allows teachers to create web learning groups, offering educational programs, though the web (Hughes 2007; McGill & Hobbs 2008). The teacher can create virtual classrooms and courses (Deng & Tavares 2013), register students, create their profiles, create websites and discussion forums, post educational material, create student groups and assign projects, create, distribute and grade quizzes, and, finally, automatically follow each student's activity (Hammond 2005; Xie et al. 2006; McGill & Hobbs 2008; Katsamani et al. 2013). The creation of a virtual classroom and the model of hybrid learning that is applied for each Moodle course, combines the presence of students in the school environment during class hours with the possibility to collaborate outside the areas of study at a time and place convenient to each school (Psycharis et al. 2013) or university student (Katsamani et al. 2013; Lara et al. 2014).

The evaluation of the reception of the Moodle platform, is a particularly interesting process, which has been implemented based on the TAM (Technology Acceptance Model) (Sánchez & Hueros 2010) with encouraging results for the current Greek education system, concerning classes related to the natural sciences (Psycharis et al. 2013). Sankey and Hunt (2013) propose the adoption of a flipped classroom approach, in order to be successful in the transition to a new mode of learning which requires both a holistic institutional planning approach.

Wendt and Rockinson-Szapkiw (2014) performed a 9-week period experiment with a group of eight-grade students in order to examine the effects of online collaborative learning. The Edmodo educational platform was used in a hybrid learning environment. This study revealed that students who participated in the online classroom had developed a weaker sense of community compared with the students of the traditional face-to-face classroom (Wendt & Rockinson-Szapkiw 2014).

The course “Research Project”: implementation in the Greek educational system

The course “Research Project” was established in 2011 for the 1st year of High School, as a distinct unit of the curriculum, which implements the main principles of the “New School”. During the academic year 2012-2013 it was also taught in the 2nd year of High School, as a distinct unit of the curriculum. The teaching of the course was supported by short training seminars and a “Research Project” guide that describes the principles, procedures, topics and its evaluation (Matsaggouras et al. 2011). Similar courses were introduced a few years ago in other European

counties, as for example the class of Supervised Personal Work (Travaux Personnels Encardes) in France (Pantanella 2000).

The research work activates students to produce new knowledge, through a “learning to learn” process, during which the participants are asked to perform research, following a specific research methodology (Matsaggouras et al. 2011). The four basic pedagogical principles that a “Research Project” should satisfy are presented in Table 1 (Matsaggouras et al. 2011).

Table 1: *The four pedagogical principles that a “Research Project” should satisfy (Matsaggouras et al. 2011)*

Type of pedagogical principal	Description of the pedagogical principal
Exploratory approach of learning	The students explore a topic, formulate goals and research questions, look for data with the help of a chosen methodology, and reach results that they publish
Interdisciplinary collaboration of teachers	Teachers of two or more different areas collaborate for the - as much as possible - pluralistic and holistic study of the chosen topic, reflecting their courses and the routine of their students
Differentiation of the content, the procedure and the context of learning	The content, the learning procedure, the style of study, the object of study, the personal view of each student are taken into consideration so that everything is adapted to the personal way of learning
Group collaboration of students	Work production as a result of the collaboration among the members of a team (intra-team collaboration) or different teams (inter-team collaboration)

Organizational background: A case study

The Moodle platform that we used was installed on a personal server. The used version was the 2.3.1, which requires valid installations of PHP 5.3.2 and MySQL 5.1.33. Students could access the platform through the URL <http://e-school.biologia.gr>.

It was our choice to use only the tools embedded in the basic distribution of Moodle, ensuring this way that no limitations or malfunctions due to possible updates would appear, particularly in the case that we would install some add-on not available in a later Moodle version. The only addition to the basic distribution was the installation of an add-on for creating questionnaires, and collecting the relevant answers. This choice ensured that we could facilitate the collection of the students' answers, and the immediate visualization of the results, since the add-on in consideration allows the direct derivation of results. This is a basic Moodle add-on that is updated very often, following the updates of the basic Moodle distribution.

We manually added the students on the platform. Students would be able to register themselves, but we chose to perform this step so that certain guidelines were ensured. In this way, the students were able to select their user-name and passwords (following guidelines specified by the Moodle platform), then we performed their registration and, finally, they received an email with the information of their registration. Along with the registration email, the students received some basic directions for their initial browsing on the platform. Among these directions was how to perform any changes on their profiles, how to present themselves on the forum, how to send emails to the teachers and their peers, etc.

After the study and analysis of the guide to “Research Projects” (Matsagouras et al. 2011), and in conjunction with our previous experience in actions similar to the projects (e.g. environmental education, health education, etc.), we identified certain items of the implementation of a “Research Project” that require a special management. Therefore we recorded that:

- there should be a presentation of each member of the plenary session in order to know each other better,
- the members of the plenary session should be divided into groups, while there should be the opportunity to communicate with each other among the whole session, and exclusively among team members,
- the participants should evaluate not only their presence and participation, but also the output of their team. The evaluation should be performed regularly so that possible deviations would be rectified with the help of the teacher-tutor,
- the participants should participate in the selection of the team of which they will be part. Although the final team determination should be in the discretion of the teacher, the opinion of the students should be recorded so that no unwanted collaborations take place,
- the participants should be able to have direct communication with the teacher-tutor, even for personal communication without making the topic of discussion public to the rest of the team or the plenary,
- each student should be able to record their thoughts, objections, ideas, through note keeping which could be accessible to the plenary or personal, and therefore secret,
- each student should have a personal portfolio, a folder where all the material that is going to be used can be posted,
- time-lines should be defined, as an important aspect of a successful team work is the coordination and simultaneous completion of partial obligations. It would be desirable to have time-lines for the plenary, the possibility to specialize them according to the goal of each team or of each member of the plenary,
- at the end of each “Research Project” a common work should be produced, a compositional project that will be the outcome of aggregated efforts of the plenary and be submitted as the final deliverable of the project,
- records should be kept during each meeting, so that each participant is aware of what they have undertaken, what has been preceded and what is expected in the next meetings,
- everyone should be kept informed of the bibliography used, so that the knowledge is diffused and the teachers - tutors are notified concerning the project sources, so that the final evaluation becomes better,
- students should be able to post files concerning the project, such as personal or team projects or slides that they created in order to present their work to the audience,
- direct and clear instructions from the teacher - tutor should exist, as well as proposals for the continuation of the project, the content of the next meetings.

In Table 2, we present how we managed to satisfy the above project requirements through the functionality of the Moodle platform:

Table 2: *Requirements of the “Research Project” and the tools of the Moodle platform that were used to implement them*

“Research Project” requirement	Moodle functionality satisfying each requirement	Note
Detailed member presentation	Personal profile creation	Possibility of continuous enriching
Participants in teams	Team creation	Each team has its own code-name and its

		members can perform certain activities in groups
Personal evaluation, team evaluation	Questionnaire (add-on for the basic distribution)	The students are asked every 15 days to complete a questionnaire, with questions concerning their participation, secret to the rest of the members
Team member choice from students	Questionnaire (add-on for the basic distribution)	The students are asked to choose a group of 4 or 5 persons with whom they would like to be in the same group, in an order of preference
Ease of communication	Direct message exchange	The participants can exchange messages with each other and with the teacher – tutor, which remain in the personal message history
Plenary and team member discussion	Discussion forum, Chats	Discussion forums and in person discussions, both for the plenary and for the group are created. The forum posts and the group chats are only accessible by the group members
Notifications - directions from the teacher - tutor	Notification forum, text posts in web-page form	A notification forum is created, with the notifications only readable by the participants. At the same time with a new notification post, an e-mail is sent to the participants for the direct distribution. Furthermore, new web-pages may be created on a weekly basis, so that the participants are informed of the topics of the next meeting and are prepared accordingly, or in order to suggest relevant material and directions
Objections, opinions, ideas recording	Notes	The note keeping can be done on a personal or public (plenary) level
Personal portfolio	Individual files repository	Saving in the individual file repository of all the files that the participant is using, with the possibility to save even large files
Time-lines	Calendar	There is the possibility to create different calendars (e.g. for the projects goals, the progress of the preparation for the presentation, etc.) and assign duties to each person, or team, or the plenary which will show notification messages
Component based project	Wiki	A very simple to use and operate wiki, that allows the collaborative composition of the final project
Proceedings	Web-page creation, new student role	An extra student role is created, which facilitates the student to compile a web-page through the platform, where the proceedings of the meeting are recorded. This role is assigned by the teacher to a student, after they express their interest
Bibliographic records	Database	The bibliographic records are facilitated, in a form with fields concerning the bibliography data, as for example the name of the author, the publication year, the title, etc
Project document posting	Document posting	The posting of different types of documents is allowed (e.g. draft documents, final documents, presentation slides). For each post the time of posting is registered, and the possibility to post comments and individual grades is available

All the above functionality may very easily be changed based on the requirements of each research project. For example, the teacher – tutor may define time-limits, within which students

are able to submit their work or complete certain questionnaires, or may change the student who is responsible for the proceedings or create new activities based on the requirements, using the above or additional functionality that the basic distribution of Moodle platform offers.

METHODOLOGY

The sample

The first sample of this work was a class of 16 students that attended the 1st year of a High School (Geniko Lykeio) in Athens during the academic year 2012-2013, and completed the course “Research Project”. In the context of this class, a total of 8 two hour-long lectures took place. The group collaboration was continued on the Moodle platform, available online at <http://e-school.biologia.gr/>. The platform offered functionality such as discussions in forums, homework posts, observance of time-lines, guidelines download, class coordination, direct communication etc (Figure 1).

The results presented in this work concern the participation of 15 out of 16 students (the last one had several problems connecting in internet).

The screenshot shows the Moodle interface for the course "Ερευνητική Εργασία - Σεξουαλική Ζωή των Εφήβων". The page includes a navigation bar with "Αρχή", "Τα μαθήματά μου", "Για Μοθητές", "PRO_TEENAGER", "Συμμετέχοντες", and "Σημειώσεις". Below the navigation bar, there are sections for "Εισαγωγικό Σημείωμα" (Introductory Note) and "Σημειώσεις ιστοχώρου" (Website Notes). The "Εισαγωγικό Σημείωμα" section contains text about the research project and the Moodle platform, along with a cartoon character holding a sign that says "REMEMBER". The "Σημειώσεις ιστοχώρου" section lists several announcements from the course coordinator, including dates and topics related to the research project.

Figure 1: Moodle platform for the course “Research Project” (main page)

None of the students who participated in the use of the platform Moodle had previous experience of it. All students were given a short time (of one or two meetings) to familiarize with basic features, while some demonstrations on basic ways of use and navigation of the platform took place. All students were required to participate in the use of the platform, and it was explained to them that, for their evaluation, information from their participation would be used, as it is defined in the research work guide (e.g. participation, on-time completion of obligations, participation in the group, collaboration, content of the project, etc.).

Data Collection

In order to evaluate the use of Moodle, two questionnaires were used. The first focused on the extent of the interest in the use of the platform and the second on the data collection for the specific topic, “Research Project” taught through the platform.

The first questionnaire was the one known as Constructivist On-Line Learning Environment Survey (COLLES), which is embedded in the platform Moodle and evaluates the e-learning process. COLLES consists of 24 statements grouped into six scales (Table 3). Each of these

scales is related to a key question concerning the quality of the web learning environment (Taylor & Maor 2000). The purpose of this questionnaire is to help tutors to understand how well the online delivery of this unit enabled students to learn. Each one of the 24 statements asks about students' experience in this unit. There are no 'right' or 'wrong' answers; we are interested only in students' opinion.

Table 3: The six scales of COLLES

Scales	Description
Relevance	How relevant is on-line learning to students' professional practices?
Reflection	Does on-line learning stimulate students' critical reflective thinking?
Interactivity	To what extent do students engage on-line in rich educative dialogue?
Tutor Support	How well do tutors enable students to participate in on-line learning?
Peer Support	Is sensitive and encouraging support provided on-line by fellow students?
Interpretation	Do students and tutors make good sense of each other's on-line communications?

The second questionnaire comprised of a set of typical, five-level Likert questions and some open questions concerning the specific topic taught with the use of the Moodle platform. Moreover, the students were asked to answer, in the Moodle forum, the following open question: "Note the positive and negative aspects of your experience regarding the use of this platform...".

Research questions

In our study we tried to answer the following research questions:

- Does Moodle facilitate a complicated course, such as 'Research project'?
- Is Moodle a practical tool for students who have never used such a LMS, before?
- Could Moodle enhance students' collaboration?

RESULTS

COLLES questionnaire

The COLLES contains a five-point Likert-type response scale - Almost Never (1), Seldom (2), Sometimes (3), Often (4), Almost Always (5) - with scores shown in parentheses. In Table 4, the average score of each dimension is presented, as well as the average scores for each of the specific statement.

Table 4: Average scores for each statement and scale of COLLES

Statements	Avg.	Scale
My learning focuses on issues that interest me.	4.3	Relevance (Avg.: 3.9)
What I learn is important for my professional practice.	3.7	
I learn how to improve my professional practice.	3.7	
What I learn connects well with my professional practice.	4.0	
I think critically about how I learn.	2.7	Reflection (Avg.: 2.8)
I think critically about my own ideas.	3.0	
I think critically about other students' ideas.	2.7	
I think critically about ideas in the readings.	2.7	
I explain my ideas to other students.	4.3	Interaction

I ask other students to explain their ideas.	3.7	(Avg.: 4.0)
Other students ask me to explain my ideas.	4.3	
Other students respond to my ideas.	3.7	
The tutor stimulates my thinking.	4.0	Tutor Support (Avg.: 4.4)
The tutor encourages me to participate.	4.7	
The tutor models good discourse.	4.7	
The tutor models critical self-reflection.	4.3	
Other students encourage my participation.	3.0	Peer Support (Avg.: 3.5)
Other students praise my contribution.	3.3	
Other students value my contribution.	4.0	
Other students empathise with my struggle to learn.	3.7	
I make good sense of other students' messages.	4.0	Interpretation (Avg.: 4.4)
Other students make good sense of my messages.	4.3	
I make good sense of the tutor's messages.	4.7	
The tutor makes good sense of my messages.	4.7	

The average score of all COLLES statements was 3.8, which is considered relatively high, a fact that translates into a positive evaluation concerning the use of the platform in the context of the class "Research Project". In more details, one can detect the positive predisposition for collaboration and teamwork, two pedagogical principles which form a basis for the successful completion of a research project.

Studying the partial scores, it is directly evident that the students are relatively easily adapted to the requirements of the e-learning environment, and they try to respect these requirements throughout the duration of the platform use. Particularly for the "Relevance" scale the average score was 3.9, and it could have been higher if there were better directions available, on how to embed this new teaching technique in the traditional learning process. Three statements in scale of "Relevance" refer to "professional practice". In the Greek questionnaire, two of them were translated as "scientific way of thinking", relevant to the work that students had to complete during the course of the "Research Project". In the statement "*What I learn connects well with my professional practice*" the expression has not been altered, because it was important to relate the students' acquired skills with their future professional development.

Concerning the interaction, it is quite satisfactory for the relation student – teacher ("Tutor Support" - 4.4, higher than every other scale). For the relation student – student, although the students seem to attempt to interact ("Interaction" - 4.0), they are not receiving motivating messages from their peers ("Peer Support" - 3.5), which would activate them better. Even within the groups the element of motivation was absent, either because the time spent together as a group was not enough to develop better communication methods or because students are not used in complimenting their peers. Time limitations may also explain the inability to perform critical thinking, which results in the low average (2.8) for the scale "Reflection".

In general, one can say that the "social constructivism" is promoted through the use of the platform, as the participation of the students' acts as a learning example for their peers. Comments, messages, answers to questions, and even queries explained by the teacher or peers made good sense, and the students used material produced by their peers. This comprises the most encouraging aspect of our work, since with an average score of 4.4 for the scale "Interpretation", it is evident that, with little improvements on the implementation directions of e-learning and cultivation of the team spirit, we could achieve a higher performance.

Course related questionnaire

In Table 5, the answers of the students to the course-related questionnaire are presented:

Table 5: Answers to the questionnaire for the evaluation of the use of Moodle

Questions	Answers
In what extent did the use of the platform facilitate the implementation of the research project? (Scale: 1-not at all to 5-very much)	Avg.: 4.1
How do you think that the course of "Research Project" could be improved?	10 out of 15 choose "through the platform use, since this leads to better organizing"

The students positively evaluate the use of the platform, since with an average score of 4.1 they consider that its use was one of the main factors to the smooth implementation and fulfilment of the research project. In the questionnaire which graded the course "Research Project", the positive evaluation of the platform highlights the importance of our choice to introduce Moodle. It is interesting to note that the students themselves were able to detect the benefits of using the platform regarding the project they had to implement. Furthermore, they consider the use of Moodle platform as a means of improving the course "Research Project", since this enables them to get better organized. The format and the structure of a research project demands a carefully organized information and task flow, which through the various offered tools of the Moodle platform (calendar, notes, discussion forums, etc.) can be effectively designed and addressed.

Answers to the question imposed in the forum

The following open question was imposed to the students through the forum area of the course: "Please note the positive and negative aspects of your experience regarding the use of the platform ...". Table 6 lists the most interesting answers.

Table 6: Answers of the students to the open question of the forum

Student (initials)	Answers
K.X.	<i>Each of us knew which part of the project was assigned to them and in which time limit it should be completed. This resulted in a better collaboration among us.</i>
G.X.	<i>The platform was an extra reason to work. Excellent idea and very helpful concerning the deadlines. I cannot find anything negative...</i>
M.T.	<i>In general we could manage our obligations and priorities ourselves ... having a specific deadline for each submission was very important since we have to learn to respect time-lines...</i>
K.S.	<i>We could also have a better collaboration as a team and as a grand total.</i>
S.F.	<i>The platform was helpful to the students and the teacher, because in this way the project was organized into steps that the teacher was able to track.</i>
N.T.	<i>The website helped to organize the work among the teams, considering the time-lines, general obligations and the progress of the project. I believe that the platform could be a bit simpler, so that all of us can handle it better.</i>
H.T.	<i>.. the discussions that took place were very entertaining!</i>
K.T.	<i>The project would definitely be more difficult without the platform!</i>
A.X.	<i>The platform is very helpful in organizing and bringing a good result to the project. It is a bit difficult to use in the beginning but, after some use, anyone can get the hang</i>

	<i>of it.</i>
I.T.	<i>The only negative I can find is that the platform needed a bit of looking around.. But with some patience it was possible to understand everything.</i>
A.X.	<i>I believe that in the future things will be even easier!</i>

Students feel that the platform ensures an organizational structure on how and when to implement their various activities. From the beginning we tried to explain to the students that the role of the platform was not to perform their job (to work on the project instead of them), but to help with the project implementation. We observe that students identify themselves the need for supervision by a teacher, able to help with the particularities of the course "Research Project". Moreover, since some students used the on-line discussion forum more often, and considered this functionality as a means of entertainment, they had an extra motivation to log-in and use the platform. None of the students who participated in this research had previous experience of similar e-learning platforms.

DISCUSSION - IMPLICATIONS

The experience we gained from the use of the platform shows that we are able to achieve important principles such as:

- effectiveness of the investigation and the management of knowledge, since the produced material is directly communicated to all the other members of the plenary session and therefore its critical evaluation is facilitated,
- students' familiarity with ICT, as they understand the pedagogical - didactic use of ICT and therefore their attitude towards the use of new technologies changes,
- assistance in the evaluation of students, since the system allows several analytical reports that record the participation of the students, while additional activities can be organized (notes production, activities implementation respecting time-lines, etc.) and these can be elements for the final evaluation of the students,
- overcoming, organizing and managing problems associated with school reality, as many teachings hours are lost or students are absent or do not understand the instructions provided, so all this can be overcome with features that are provided by the platform,
- technically, it is a free distribution platform that anyone can either install or use a pre-existing installation. The personal installation on an available server has the advantage of full management, control and therefore the prohibition of the display of advertisements which are not consistent with the educational process, as well as the selective installation of applications and add-ons that can help satisfy certain needs that arise during the educational process,
- easy to use, does not require any additional software or interface, simply a browser for the access to the platform websites. In this way, the platform is easy to use even from the school PCs, which, in many cases, do not have recent software updates or have low computing power,
- no restrictions on who can participate, both students and teachers. Furthermore, it is possible to allow access to others, defining rights and navigation capabilities on the platform, as for example for the school director, the coordinator of Research Projects, the school advisor who is the pedagogical responsible for the school, the parents, etc.

The choice of functionality offered by the Moodle platform, and its relation to the demands of a research project enable the satisfaction of the four pedagogical principles presented in table 1 for the function of a plenary, as noted by our empirical research study.

In general, we consider that the “Research Project” course would be better to expand over the whole academic year, rather than over just one four-month period. The culture of teamwork has to be further cultivated and reinforced. Students should motivate and support their peers, compliment and reinforce their attempts, join the core of the team and, finally, realize that any benefits do not stem only from their final grade, but also from the process of collaboration. The use of the platform could become a part of one of the computer oriented courses that are currently taught within the default education in the Greek high school, so that the students obtain a better understanding of the offered functionality and usability.

CONCLUSION

Our initial goal was to find a solution to a common problem of the course “Research Project”: how to overcome administrative difficulties that often concern the plenary meetings and to assign the time of the meetings just for creative discussions about our work. We aimed at the proposal of a solution that could better organize the research work, so that students could devote their time exclusively to the realization of the research work. The experience we gained from the use of the Moodle platform and the corresponding opinions of our students showed that we managed to reduce management weaknesses and devote to the creative perspective of research projects.

The Moodle platform does not perform the course “Research Project”, since this is the students’ job. The scope of the platform use is to organize the plenary members in the design and implementation of the research project. The role of the teacher – tutor is incomparably important, since he/she is who helps the participants with the implementation of their project. The use of ICT in this proposal is limited to the administrative and supportive role. The work output is the result of the collaboration of the plenary members, under the supervision of their teacher.

The choice of the Moodle platform in the context of the course “Research Project” met a positive acceptance from the students. The multilevel and multidimensional nature of the course required a holistic and organized approach, while the teamwork of the participants required a management strategy that would meet the needs of the chosen methodology. Participants believe that the dynamics and characteristics of the platform offered additive value to their venture, and could easily resolve organizational issues and engage with greater comfort in the course, a factor which is consistent with other research activities (Katsamani et al. 2012; Psycharis et al. 2013).

An important finding is the cultivation of a mutual-help environment, where students could be improved not only by the direct instructions of their teacher, but also of their peers. Each team member was using cognitive resources either produced by other members, or recorded as questions with specific answers. Therefore, the material produced within the platform acquired pedagogical - teaching value (Rapetti & Marshall 2010), since it could be absorbed by other members as well, and form a new body of knowledge, able to promote learning, and thus to positively affect the other participants. Although according to Rapetti and Marshall (2010) the younger are much more familiar with ICTs in their daily routine, however a clear distance between the younger and the older does not seem to exist when using digital technologies in the learning process.

The difficulties that we encountered concerned the use of the platform and the application of directions and rules. Most students initially felt insecure and unable to use the additional individual tools (features) of the platform. This however, was a temporary difficulty, which was overcome with the teacher’s intervention. Moreover, we detected a partial inability to further activate the teamwork of students who worked more as units rather than group members. According to our understanding, this was not due to the platform, but due to the fact that there were not enough interventions that could enhance the existing amount of teamwork. The

introduction of a social networking media, like Facebook, coupled with the use of the platform could help towards this direction, as it has emerged from other studies as well (Deng & Tavares 2013). Our experience showed that when clear instructions on how to proceed were given to the students, the results were always encouraging.

Research limitations - Perspectives

The described work was performed in only one class of 16 students, and the sample was relatively small. This fact is a main limiting factor to the generalization of any results concerning the use of the Moodle platform in the context of the course "Research project". Moreover, all the students were attending the same school and knew each other. This may improve the collaboration opportunities, but does not allow deducing meaningful results, and comparing to a web-based collaboration of learners, who do not know each other before the beginning of the learning process. Never the less our findings could be useful to others completing the use of an online platform to support student research projects.

As a future work, we will study the use of the platform for the implementation of the course "Research Project", in collaboration with students from other schools. This will reveal whether the mechanism of "social constructivism" will be activated among students that do not know each other. At the same time, the sample of our study will comprise a larger number of students. Our experience from the use of the Moodle platform within secondary education reveals that students are always ready to respond to challenges that enable them to behave beyond the usual and conventional ways. This regards necessities generated within the changeable and volatile environment of education. The use of ICT does not replace the imagination and creativity of the students and the teachers, but helps with bridging the gaps and weaknesses that emerge from the teaching method and the existing socio-political conditions. Teachers as enablers and agents of social evolution should manage the arising opportunities.

Taking into account the feedback from the students and our own findings from the application of our proposal, we will try to improve it and add further functionality. Among the extra functionality we could activate is the possibility of direct evaluation of each student activity, using a scoring rubric, as this is presented in the research project guide, or the automatic plagiarism control of the students work. Moreover, we could create guideline videos for easier browsing and access on the platform, or perform certain interventions so that our proposal may be used for other types of research projects.

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