Using LAMS to teach Geography and Biology in K-12 students: A rural Greek high school case study

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Students in remote rural schools in Greece lack often both motives for participation and opportunities to participate in innovative lessons. Two LAMS sequences were applied in the context of Geography and Biology disciplines. The students, although sceptical and reluctant in the majority initially to participate, turned out to be very enthusiastic. The LAMS sequences proved to be very attractive to them. The sequences also proved to be a more efficient learning means from traditional methods applied to this target group.

Keywords: LAMS sequences, remote schools, Geography, Biology

Introduction

Contemporary information and communication technologies (ICT) appear to provide support for assisting the process of teaching and learning. The potential of learning design to improve teaching and learning through e-learning is a subject that is currently gaining recognition. ICT is commonly used in the delivery of learning and teaching to offer functionality and opportunity that holds strong potential for the development, storage and access of reusable and sharable learning designs.

Despite the plethora of ICT tools and resources available, practitioners are still not making effective use of e-learning to enrich the student experience (Conole and Fill, 2005). A supposed benefit of learning technologies is their potential for providing access to a wealth of knowledge and tools for students to interact with the knowledge, the teacher and their peers. Yet teachers receive little guidance on how to use these tools to best effect (Falconer & Littlejohn, 2007). Pioneer teachers make significant efforts by themselves.

LAMS (Learning Activity Management System) is software for designing, managing and delivering online learning activities which was developed by James Dalziel of Macquarie University in Australia. It allows teachers to create sequences of activities for learners supporting a variety of models of learning. The learning design tool, LAMS, is promoted by LAMS International (2007) as "a revolutionary new tool for designing, managing and delivering online collaborative learning activities".

The objectives of this paper are twofold: namely to evaluate the use and suitability of LAMS as an activity-based e-learning tool across rural high schools. This study will focus on evaluating the impact of LAMS on learning and teaching in a rural high school and establishing whether it is feasible to re-use and, or re-purpose a sequence of learning activities.

Theoretical background

Design for learning is a comparatively new field. Dalziel (2003) stresses that 'Learning Design' is activity based and "more concerned with context rather than content" supporting collaborative as well as individual learner. Butler (2004) reported that teachers felt that LAMS aided their students' learning, understanding, cognitive skills and enhanced motivation. He

stressed that motivation remained high, “even after the students had been using LAMS for more than a year”. LAMS enabled teachers to produce “a fully operational lesson, not just a paper-based outline that still had to be translated into a lesson” (Cameron, 2006).

LAMS is an open source tool for designing, managing and delivering online collaborative learning activities. By using LAMS teachers gain access to a highly intuitive visual authoring environment for creating sequences of learning activities (Dalziel, 2007). These activities may be individual tasks, small group work or whole class activities.

The creation of sequences of learning activities which involve groups of learners interacting within a structured set of collaborative environments, referred to as “learning design”, is less common and LAMS allows teachers to both create and deliver such sequences. LAMS trials indicate it can transform the approach teachers and learners take towards e-learning in the both K-12 and the higher educational learning contexts.

The idea of design for learning offers practical benefits to teachers in terms of improved teaching quality and efficiency. Documenting the design of learning activities that have proved effective, is to share and reuse practice, providing advice and guidance and increasing the efficiency of planning in learning. The issue of re-using and re-purposing LAMS designs is a theme explored by several studies (Masterman and Lee, 2005).

Finding, creating or adapting, suitable learning designs can be both challenging and time consuming. Sharing and adapting effective learning designs for blended learning is both a stimulant and a time saver. Unlike many failed attempts at fostering re-use and adaptation with e-learning content, LAMS sequences are easily re-used for different discipline areas or different groups of learners, and easily shared and adapted by the same or different teachers.

There is little research regarding students in rural high schools using LAMS.

The key issue for this paper is:

> Does the use of a learning design tool such as LAMS support effective practice in designing for learning and an individual teacher at a rural high school?

Methodology

This case study is set within the interpretive paradigm (Cohen, Manion & Morrison, 2007). In this paradigm the viewpoints of the participants are examined taking a holistic approach.

The Avgio High School (Gymnasio Agviou) is a special school, although not officially ranked as such. It is located at a rural area of Ilia in Western Peloponnese, 7Km away of the small town of Amaliada. The students attending the high school are gathered from five different small villages. The students’ family background is mainly agricultural.

About 50% of the student population comes from the village Kentro. People living in Kentro are of Rom origin, however settled permanently there for many decades. Their community is somehow closed and discriminated by the surrounding villages. However in the Avgio High School the students from Kentro have to coexist and advance with their fellow students from the other villages. They are proud and independent people, which makes them difficult to follow the school rules being however some of them very clever. For them, attending school is already a victory, against the stereotypes of their tradition. Moreover, in the school there is a number of students with learning difficulties, both among students from Kentro and from the other villages. None of the students, however, is officially diagnosed. The parents resist to the teachers suggestions to seek help from specialized state personnel most probably fearing that their children will experience social discrimination.

One LAMS sequence targeted the second class (Class B) of the Avgio High School, having fourteen students (14 years old) with all the above characteristics. Their overall performance is poor to moderate, their attention during lessons is very often disrupted and lessons are in most cases going very slow. Out of the fourteen students, there is one female student, who stands out in terms of performance and another two female students who have some potential. Also there are three male non-Kentro students, with severe undiagnosed learning difficulties.

The second LAMS sequence targeted the first class (Class A) of the Avgio High School, having 10 students (13 years old). Again this class has most of the characteristics, already described above. However, there are three female students, who are well above the average level. The presence of these students has a positive effect on the whole image of the class, as all students are much more cooperative.

Sequences' Structure and description

There were two LAMS sequences developed and applied.

1. The "Mediterranean Sea" sequence

The sequence, "Mediterranean Sea", has a planned duration of two didactic hours and was applied to the Class B in the context of Geography. The sequence is published in http://lamscommunity.org/lamscentral/sequence?seq_id=1142533. The educational objectives of the sequence are that the students should after its completion to be able to:

- Recognize Mediterranean Sea on the globe;
- mention the major peninsulas, islands, points of communication to other seas, countries around Mediterranean Sea;
- mention the major climatic characteristics of Mediterranean Climate, major native plants and agricultural products;
- know the basic elements and benefits of Mediterranean Diet;
- Know which food should be preferred and which should be avoided.

The LAMS sequence had the following structure:

1. Introduction and objectives

2. Geographical information
    a. Investigation: The students are asked to identify on the map major geographical features of the Mediterranean. The students should note down the links of Mediterranean to other seas, its larger islands, its major peninsulas and the countries with significant shoreline. Before proceeding, the students are left to check other's answers and modify their own if needed.
    b. Summary of Mediterranean Sea's major geographical information.

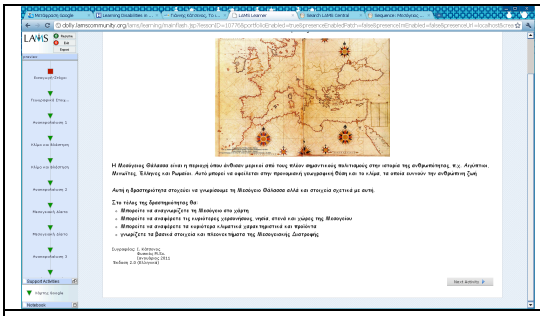
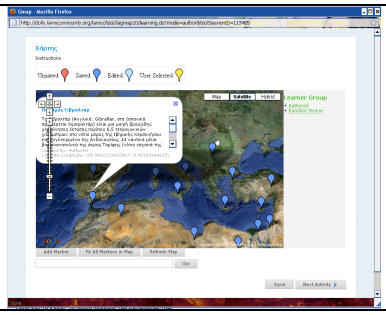
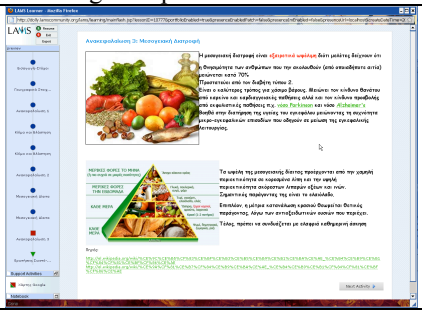
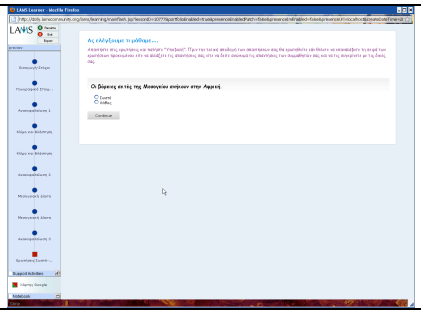
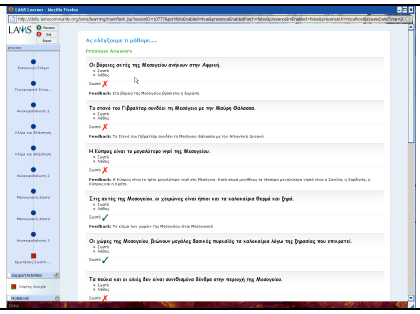
3. Mediterranean Climate & Vegetation
    a. Presentation: The students are requested to watch an annotated video presentation about the major climate and vegetation of the Mediterranean Sea.
    b. Investigation: Based on a presentation attended at the previous activity (and having the ability to navigate forward and backward), the students are asked to discover the specific characteristics of Mediterranean climate and typical Mediterranean vegetation of the northern shores of the Mediterranean. The students are asked to note down their answers and before proceeding, the students are left to check other's answers and modify their own if needed.
    c. Summary: This activity summarizes the knowledge about climate and vegetation of the Mediterranean Sea.

4. Mediterranean Diet

a. Presentation: The students are requested to watch an annotated video presentation about the basic elements and benefits to human health of the Mediterranean Diet.
b. Investigation: Based on the presentation attended by the previous activity (and having the ability to navigate forward and backward) the students are asked to isolate and note down the characteristics of the Mediterranean diet and its benefits.
c. Summary: This activity summarizes the elements and benefits of the Mediterranean Diet.

5. Evaluation
It involves twelve right/wrong questions to assess knowledge gained in previous activities. Three questions are related to the geographic data, four questions are related to the Mediterranean climate and vegetation and five questions are related on the Mediterranean diet and its benefits.

Table 1: LAMS sequence screenshots

	
Welcome Screen and Objectives	Using Gmap tool to locate information
	
Annotated video presentation regarding Mediterranean Climate	Summary page for Mediterranean Diet
	
Right/Wrong questions	Summary of right/wrong questions' answers

"Mediterranean Diet"

This sequence is a fraction of the above sequence "Mediterranean Sea", modified in terms of contents and technically improved. Essentially, it is the forth part of sequence "Mediterranean Sea", combined with a new Introduction and Objectives activity, as well as with changed Evaluation Part. The sequence targets Biology of the Class A of Greek High School. Its planned duration is one didactic hour. The sequence is published in http://lamscommunity.org/lamscentral/sequence?seq_id=1208947

Observations

All observations were quite similar for both classes, therefore they are listed together. Wherever there was a difference, it will be pointed out.

Observations before the application

- Most of the students of the Class B were sceptical and reluctant to try this new approach, while students of the Class A were more curious.

- Since this was the first time that the students were going to use the LAMS environment, there was a presentation of it beforehand. This initial presentation aimed to introduce the students to the user interface of the sequence (actually the one provided by LAMS). The feeling here was that this didn't gained students' attention as much as expected, as it seems they perceived it as nothing different than the usual unidirectional transmission of information from their teacher to them. However, introducing the students to an unknown environment is something that shouldn't be omitted.

- The students of Class B formed seven pairs (named avgio1 to avgio7), whilst those of Class A were separated into five pairs (avgiot1 to avgiot5). The reason for this was actually practical, due to lack of a sufficient number of workstations. However, it was thought at that time, that forming pairs would facilitate the sequence application, expecting that stronger students would help weaker ones. Each pair had its own user account on the LAMS server of Hellenic Open University, in order to be able to track pair's performance afterwards.

- Pairs' composition was done by the teacher. The first pair in Class B (avgio1) was formed by the students having the best grades of the class to serve as later reference for comparison. For forming the other eleven pairs it was chosen to have one strong part and one weak part, in terms of their grades and overall performance. It was also given special attention to account for compatibility of the student's personalities and their ability to collaborate.

- Pair composition was an issue for the students, from the very beginning. There were complaints for the partner chosen for them in several cases. Complaints were heavier in the Class B, while in Class A the students accepted it more easily. This probably has to do with the mentality of the students of the Class B, as explained in previous section and the fact they are one year older.

Observations during sequence application

- The LAMS sequence application was done in the high school's computer lab with help provided by the informatics teacher.

- During the first half of the sequences, the progress was slow and the students required a lot of help by the teachers. Requested help concerned mainly navigation but there were also questions regarding the content due to unknown terms. During the second half the requests for help were significantly less, as the students were familiarizing with the LAMS environment and the sequence itself. Requests for help were more in Class A, which is considered normal given their lower familiarization with computers.

- All pairs copied the information into their physical notebooks and then they wrote it down for a second time electronically wherever it was requested by the sequence. This was not planned and proved to slow down the progress. It is then important that the students should be familiar with the copy/paste process and to windows alteration, in order to smoothly proceed or extra time should planned.

- Nine out of twelve pairs concluded the sequence. Of the other three pairs:
    - one pair just advanced through the steps without really giving effort, trying to avoid real work;

- two teams (of different classes) remained with only one member, as the other was absent. Despite the fact these particular students are very clever, they didn't have enough computer literacy and despite the increased support they received, they soon got disappointed and quitted their effort.

- The stronger pair (avgio1) was capable of noticing a difference between the school textbook and information taken from Wikipedia regarding the relevant size of Crete to the other Mediterranean islands.

- One pair had an "accident", one of the students (the lowest performer in the class) turn off the computer! They started all over again and they managed to finish thanks to the other student, who was very dedicated.

- The collaboration of a female student with very good grades and a male student with high computer literacy in Class A resulted in them finishing well before the others and with a very good outcome.

- One pair of the second class, having finished their work, remained in the lab helping and supporting two other pairs to reach the end.

Sequence application evaluation

The main means of evaluating the application of the sequence was structured discussions with the students of each class on the next session with them. The discussions were planned to:

1. Find out what is their experience on computers and how they normally use it;
2. Investigate how they perceived the digital lesson and if they would like to repeat it and why;
3. Investigate if and how their partner helped them during the application of the LAMS sequence;
4. Investigate their degree of confidence after first time using LAMS;
5. Get their opinion on the sequence (structure, content, guidelines, interactivity).

The results of these discussions are listed below:

- More than half of the students own a desktop computer at home. Some of them also have a netbook. However, only three students have an internet connection. The students use their computers to store their photos, to move files to and from their mobile phones and to play games.

- The vast majority of the students declared that it was a fruitful experience for them and they look forward to repeating it. Actually, most of them were enthusiastic and expressed the wish that "the school to be like this everyday". This was a total reverse in the initial approach, especially for the second class.

- Again the vast majority, declared that they learned something new and they were in a position to mention examples of new things they learned (e.g the pyramid of Mediterranean Diet).

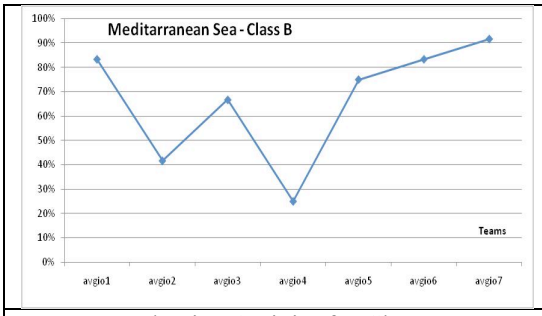
- Some of them mentioned that learning with LAMS was similar to a game, while others (in fact younger ones) repealed this opinion and considered LAMS sequence as very serious issue.

- When asked why they liked learning through the computer, they answered that it was more interesting, less boring, more interactive and one female student mentioned it was easier than looking for information into maps and tables of data.

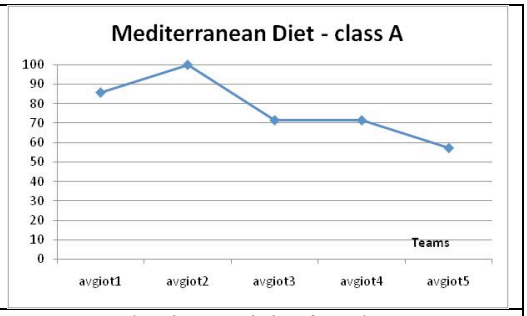
- Half of the students want to choose their partner next time as only half of the students felt they received help from him/her (this was expected due to the formation of the pairs). However half of the students also think they can do it alone next time, which can be interpreted as a sign of increased confidence.

- There were no suggestions for improvement as the students declared they were satisfied both from the content and the sequence guidelines.

- Seven out of twelve pairs achieved 67% or more on the final sequence activity, which is indicatives that the students were focused.



Evaluation Activity for Class B



Evaluation Activity for Class A

Conclusions

The introduction of the LAMS sequences in Avgio High School certainly exceeded the expectations of the teacher for this particular student population. The students overcame themselves, showing interest and achieving more than in the usual teaching sessions. The LAMS sequences proved to be a very attractive means of learning for high school students. Learning with LAMS can be interactive and gives the students the feeling that they 'do' things, thus enabling learning by doing.

The difficulties related to basic computer skills were significant, however these are expected to be less next time. For running the sequences smoothly, the students should made familiar with copy/paste process and should be able to alternate the active window.

LAMS sequence preparation effort of the teacher for the sequence "Mediterranean Sea" was significant; however the modifications to create the "Mediterranean Diet" sequence needed no more than 10% of the initial effort, giving a very good reusability result. In all cases, the results from application in Avgio High School persuaded the teacher that the effort was worth it. After all, both sequences will be ready next time, demanding zero effort!

The findings of this case study are that the design for learning tool, LAMS, enhanced the teaching and learning experience of the teacher and students who used it at rural high school, had a positive effect on student motivation and participation and aided independent learning. All the students want to use LAMS again and, in this case study, enhanced learning. The teacher also wants to use LAMS again and considered that LAMS complemented the way he plans lessons, giving them an opportunity to create a range of activities that he could not provide without it. However, as this is a small case study, any conclusions cannot be generalised.

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