

# Measuring Internet Audiences and Usability of an Online Course

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## Abstract

In this paper, we attempt to outline a variety of methods used to construct a richer conception of the audience of a modern Greek online course. First an analysis of the design methodology employed in this specific case study is provided and then examples of how valuable usability information can be extracted from the log files are presented. Conclusions, related to the analysis of the log files, about the usability of the course are also provided.

## Keywords

Web usability, server logs analysis, distance learning, human-computer interaction, online communities, human factors, internet.

## 1. Introduction

### 1.1 Learn Greek online

Kypros-Net, Inc. is a not-for-profit organization that provides information on-line about the island of Cyprus, including news, history, culture, etc. Its web site ([www.kypros.org](http://www.kypros.org)) receives about 1 million hits per week. One of its services is an online course for learning Greek. The course includes 105 audio lessons with corresponding notes, a Greek-English-Greek dictionary, and a spellchecker. In addition, a section of the site's discussion board is dedicated to student questions about the course.

The Greek on-line course content evolved gradually over three years. Based initially on 105 (around 20 minutes each) digitized lessons it gradually developed into a complete Greek Language course

The web site was developed by the Kypros-net team in 1998. The site was designed to encourage student participation in its subsequent development (Participatory Design).

Table 1 depicts the various elements of the Greek on-line course and figure 1 shows a screen shot of the course.

In developing this course, a fundamental challenge has been to develop coherent virtual spaces that take advantage of the interactive nature of the World Wide Web (WWW) which will enable dialogue and information sharing among the students taking the course, interested educators and the design team. With respect to the facilitation of dialogue, we have developed an interactive online course where visitors can learn the modern Greek language and communicate, asynchronously or in real time, with other distant learners taking the course.

Our design methodology has promoted from its earlier stages the direct participation of our students in the development of the course both in terms of their involvement in providing feedback to the design team but also through their direct involvement in the construction of sections of the course. Furthermore, we have created a number of mechanisms to permit us to learn who our visitors are, why they've come, and what they can contribute to our understanding of the patron base for on-line language courses. In this paper we report on some of our methods used in the design of the course and in knowing our audience.

Table 1. Elements of the Greek on-line course

Section	Content Description
Digitized Lessons	105 (around 20 minutes each) digitized Greek language lessons. They range from elementary to advance level teaching of the Greek Language. They were retrieved from the archives of the Cyprus Broadcasting Corporation radio.
Online Notes	Developed by students through the use of participatory design methodology
Greek Dictionary	Contains 13356 words with ability for translations from English to Greek and Greek to English.
Greek Speller	Both modern Greek and ancient Greek so that students can identify difference and similarities among the two languages.
Message Board	Contains threaded discussions for asynchronous communication among the students.
Chat	Synchronous communication among the students.

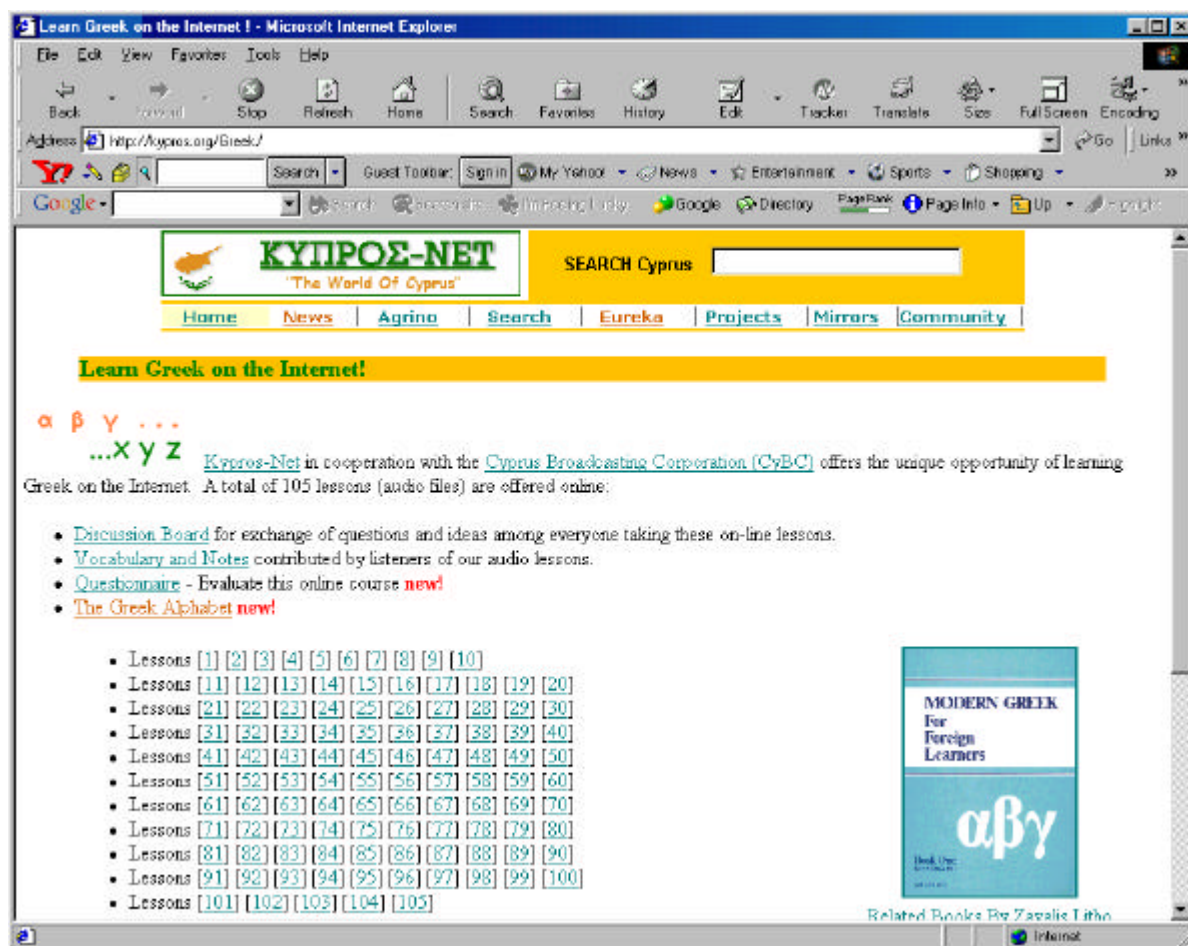


Figure 1. Screen capture of the main page of the learn Greek online course

## **2. Design**

### **2.1 Design Methodology**

Participatory design (PD) (often termed the "Scandinavian Challenge" [2]) refers to a design approach that focuses on the intended user of the service or product, and advocates the active involvement of users throughout the design process. User involvement is seen as critical both because users are the experts in the work practices supported by these technologies and because users ultimately will be the ones creating new practices in response to new technologies [3].

Blomberg and Henderson [3] characterize the PD approach as advocating three tenets:

- The goal is to improve the quality of life.
- The orientation is collaborative.
- The process is iterative.

### **2.3 Design Approach**

Our focus has been to design an online learning community. We believed that this online interaction and community would increase our users' motivation, commitment and satisfaction with the online course. The Participatory Design methodology blends nicely with our goal. In particular, involving users during system development is thought to lead to greater user commitment, acceptance, usage, and satisfaction with the system [1].

In the design phase of the on-line Greek language course, we implemented PD as a four-step process [4].

#### *1. Building bridges with the intended users:*

This step opened lines of communication between intended users and the development team. Specifically this step involved the initialization of a multidisciplinary development team, identifying key groups of end users, and creating new methods of communication with users.

The development team came out of the Kypros-Net Inc. (<http://www.kypros.org>) group. Through their involvement in Cyprus and Greece related projects, they had longstanding relations with the intended user community.

The intended users have been especially people of the Greek Diaspora, travelers to Cyprus and Greece and other Greek speaking areas and people who are generally interested in the Greek culture and language or languages in general. In our case bridges with the intended users were built through our years of work at providing information about Cyprus through the web pages of Kypros-Net, Inc. who primarily attracts the same user population as our intended Greek language online course.

#### *2. Mapping user needs and suggestions to the system:*

Our conceptual design model has been "to design an online effective Greek language course that can build and sustain an online learning community of students".

Based on the questions and inquiries we received from our users we tried to match their needs (they wanted an easy to follow, both elementary and advanced course that they could attend at their own pace) with our conceptual design model.

#### *3. Developing a prototype*

The project consists of 105 audio files, which were originally recorded as Radio lessons in Modern Greek for English speakers back in 1960's. The lessons were retrieved from the archives of the Cyprus Broadcasting Corporation, digitized in Real Audio 5.0 format and published on-line. Although, an optional textbook

accompanied the original Radio lessons, the lessons were designed as a complete standalone course. We used several tools to assist the students of the lessons, including an online English-Greek-English dictionary, a Greek spell checker and a web-based discussion board for the students of the lessons.

#### 4. *Integrating feedback and continuing the iteration*

Feedback from our users and suggestions are continuously incorporated into our design through a series of additions and corrections. For example, we were asked to add an online notes section and to encode some files again because they were corrupted. An important element in the participatory design methodology is the direct involvement of the user in all stages of the design process. At some point, the users started exchanging through email written notes taken by the advanced users. This phenomenon suggested that we should provide the users with the capability to post their notes on the project's site. Two months later, the students of the Audio lessons have managed to transcribe 81 out of the 105 lessons, correct them through a peer review process among themselves and post them on the project's website. Six months after that, the students had transcribed and peer reviewed all 105 lessons. They have also compiled lists of verbs and vocabulary words used in the Audio Lessons, and other grammatical notes.

### 3. Analysis of Server Logs

The data described below are taken from the cumulative log file record, a 590-megabyte corpus, for a 30-month period from July 19, 1998, when the learn Greek online project was officially “launched,” through December 31, 2000. The project is a unique complete online course of the modern Greek language and has been extensively promoted on the internet and by the Cyprus Broadcasting Corporation on local Cyprus radio and television. These logs, in the extended log file format, keep track of who was visiting the site (unique internet addresses), when they came, what they requested, how long they looked at each page, where they were before they came to the site, what browser they were using, what country they were from, and more. Log files were analyzed using wusage (<http://www.wusage.com>) . Table 2 represents the overall access statistics for the 30-month period.

Table 2. Access statistics for the learn Greek online course, July 19, 1998, to December 31,2000

Total number of successful hits	3,704,104
Total number of user sessions (visits)	1,256,770
Distinct Users	900,481
Average hits per day	4061
Average user sessions per day	1378
Average user session length	0.47 minutes
Average number of documents examined by user	2.55

#### 3.1 Site Traffic

Traffic to the site peaked following the addition of each new item and any publicity campaign, then tapered off considerably during the late spring and early summer, probably in correspondence with the academic calendar, and then picked up and resumed a state of about 1378 user sessions per day. (User sessions are defined as a sequence of HTTP requests from a unique user, as determined by internet protocol address. Sessions are considered to have terminated if there are no requests for a 30-minute period.) During the 30-month period, there were an estimated 1,256,770 user sessions, lasting an average of 0.47 minutes with the longest lasting 174 minutes. Sessions were split roughly equally between daytime (8:00 a.m. – 6:00 p.m., user’s local time) and evenings (6:00p.m. –8:00a.m., user’s local time). There were 46.7% of sessions in the daytime and 53.3% in the evenings.

As we can see from Figure 2, the accesses the audio lessons, the language tools, and the total access of the message board and the notes pages, all kept increasing exponentially. However, once we allowed our users to publish their own notes, there was a dramatic shift of traffic from the message board to the notes pages. The shift happened, probably because it was no longer necessary to visit the message board to find out where other users had posted their notes, since all were aggregated in a central location.

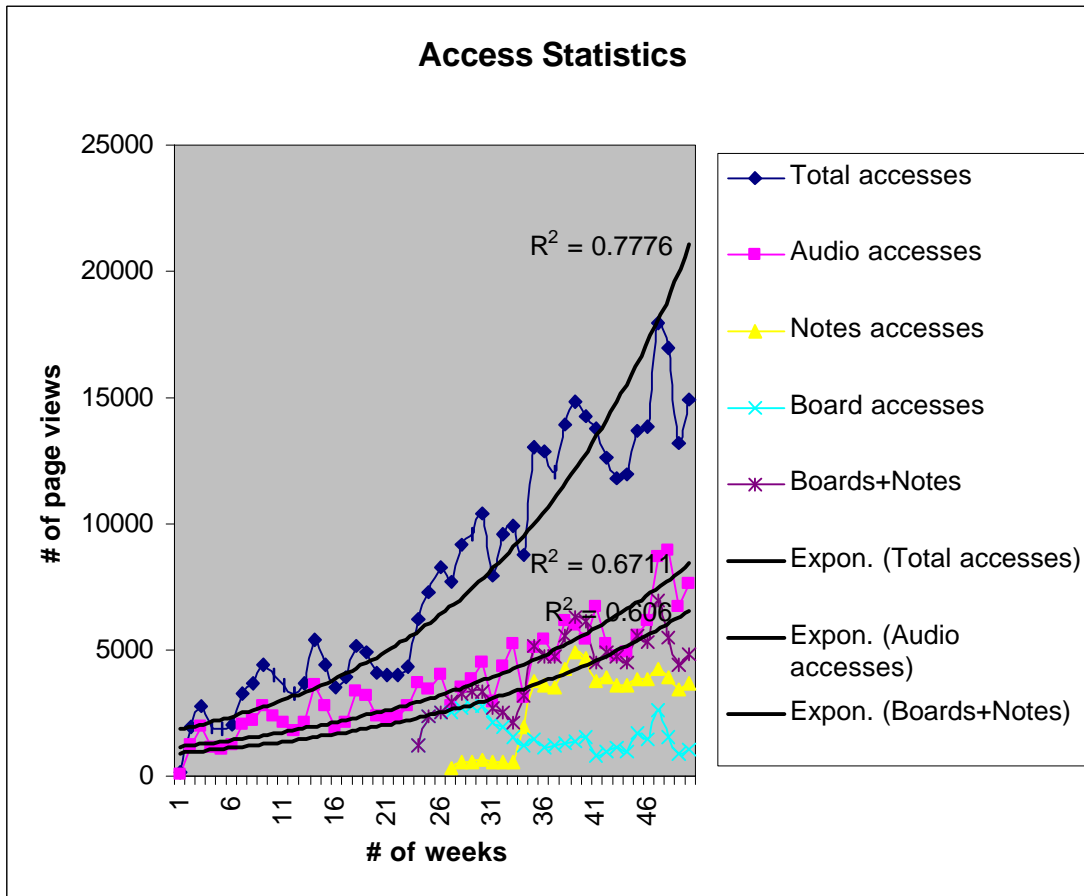


Figure 2. Access statistics for learn Greek online site.

### 3.2 Requests for Site Features

With respect to features of the site that were accessed, 25.61% of the hits were caused from accesses to the Greek-English-Greek dictionary associated with the course indicating a substantial usage of this tool by the students of this course or even by visitors that are not regular users of the rest of the items of the online course, this is further supported by the fact that over 40% of users enter the site through the dictionary section. The main course page attracted 13.71% of the accesses. From the individual audio lessons, it can be observed that lesson one runs high (6.43%) whereas the rest of the lessons received accesses below 1% of the total.

### 3.3 Users' Software Profile

The server log analysis enables us to detect the software (browser and operating system) that our user population uses when accessing our site. The majority of our users uses Microsoft Internet Explorer as their browser (41.5% MSIE 5, 20.8% MSIE 4) with Netscape coming second (10% Netscape 4). In terms of operating system Windows 98 comes first with 30% of visits and Windows 95 second with 20% of visits.

### 3.4 Referrer Log Entries

Analysis of the referrer log data suggests that most of the traffic that did not come as a direct result of one of the links on the Kypros-Net other pages arrived at the course website from a net guide or search engine. For instance, more than 130,000 accesses came from yahoo, 13,962 from msn, 13,346 from altavista and 8,551 from google. The keywords that most frequently brought visitors to the site were "greek dictionary", "greek language" and "greek translation" again showing a high popularity for the dictionary of the course.

### **3. Conclusion**

On the learn Greek online site, we implemented a combination of features that allowed us to triangulate, giving more accurate and richer information about our audience. We encouraged our audience to give us immediate feedback through email alias. We also encouraged interactivity among our audience by creating and maintaining the message board and chat room of the site. Through analysis of the logs, we were able to capture a more sophisticated portrait of our audience.

Furthermore valuable usability conclusions (what sections are most popular, what software our users are using) can be drawn through the analysis of the server log. Such feedback can guide the design team in emphasizing specific sections of the site and to implement enhancements on important sections that seem to be receiving less traffic than expected.

Log analysis is only one of several such mechanisms. Qualitative methods of data collection, such as user surveys, focus groups, and other feedback mechanisms, can gather user opinions on site content, navigation, or look-and-feel, as well as assess user satisfaction and the reasons that users visited the site or navigated as they did. A site's usability--which will affect both rate and manner of use--can be evaluated through various methods to reveal whether the site is accessible, easy to navigate and appealing to users. [5]

Future research on this specific case study can include heuristic evaluation of the course, survey and interviews with representative users, and finally a formal usability test on specific tasks with real users.

Those who wish to study traditional courses have accurate information about their audience from class listings, interviews and surveys. Creators of on-line courses have digital counterparts to these measures. In this paper, we attempted to outline some methods we used to construct a richer conception of the audience of the learn Greek online course.

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### **References**

1. Baroudi, Olson and Ives, 1986, "An Empirical Study of the Impact of User Involvement on System Usage and Information Satisfaction," *CACM*, 29(3), 232-238.
2. Bjerknes, Gro, Pelle Ehn and Morten Kyng, (eds.), 1987, *Computers and Democracy - A Scandinavian Challenge*. Aldershot, England.
3. Blomberg, J.L. and Henderson, A., 1990, "Reflections on Participatory Design: Lessons from the Trillium Experience," *Proc. of CHI'90*, April 1990, Seattle, Washington, 353-359.
4. Ellis, R. D., Jankowski, T. B., and Jasper, J. E., 1998, "Participatory design of an Internet-based information system for aging services professionals." *The Gerontologist*, 38(6), 743-748.
5. Haigh, S. and Megarity, J., 1998, "Measuring Web Site Usage: Log File Analysis," *Network Notes*, 57.