

# Designing and Implementing an Innovative Course about World Wide Web, Based on the Conceptual Representations of Students

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**Abstract**—Internet is nowadays included to all National Curriculums of the elementary school. A comparative study of their goals leads to the conclusion that a complete curriculum should aim to student's acquisition of the abilities to navigate and search for information and additionally to emphasize on the evaluation of the information provided by the World Wide Web. In a constructivistic knowledge framework the design of a course has to take under consideration the conceptual representations of students. The following paper presents the conceptual representation of students of eleven years old, attending the Sixth Grade of Greek Elementary School about World Wide Web and their use in the design and implementation of an innovative course.

**Keywords**—Conceptual representations, Constructivism, Internet Didactics, World Wide Web.

## I. INTRODUCTION

WORLD Wide Web offers an enormous range of easily accessible information. Therefore students have to conquest capabilities of collecting information through the Net but also adopt principles towards a responsible, critical and safe use of it. Taking under consideration the above and based on their conceptual representations about Internet a course was designed and materialized about World Wide Web, with the participation of eleven years old students.

## II. THEORETICAL FRAMEWORK

Contemporary psychological approaches of learning and science didactics create a new, common base for the design and the materialization of various subjects. Nowadays the aspect that learning procedure is not possible to be materialized if it doesn't take under consideration the conceptual representations of students and the process of knowledge construction is becoming more and more acceptable.

Thus, learning is not a knowledge collecting process, is not being acquired or transferred. On the contrary, it takes place when the student's exploration of the student reveals inconsistencies between current representations and experience. In that case, a student tends to change his/her

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conceptual model not necessarily in order to replace it by the objectively right but by the most viable one [5]. A major theme in the theoretical framework of Bruner is that learning is an active process in which learners construct new ideas or concepts based upon their current/past knowledge. The learner selects and transforms information, constructs hypotheses, and makes decisions, relying on a cognitive structure to do so. Cognitive structure (i.e., schema, mental models) provides meaning and organization to experiences and allows the individual to "go beyond the information given" [1].

Therefore, starting point of learning is what a person knows or ignores before teaching. Often traditional teaching slightly effects the conceptual representations of a student not only after a course but even after adult age [10], because of the ignorance of conceptual representation during teaching. It is clear that a teaching course based on constructivism has to study the conceptual representations of students in order to use them if they are according to a scientific model or to reconstruct them if they are conceptual obstacles, via the creation of conceptual conflict learning conditions [8].

Also the instructor should try and encourage students to discover principles by themselves. The instructor and student should engage in an active dialog (i.e., socratic learning). The task of the instructor is to translate information to be learned into a format appropriate to the learner's current state of understanding. Curriculum should be organized in a spiral manner so that the student continually builds upon what they have already learned [2].

## III. METHODOLOGY

### A. Objective

In the following sections is presented the design and the implementation of an innovative course about World Wide Web in which took part students of the last grade of Greek elementary school. The objective was the design and implementation of an innovative course about World Wide Web based on the study of student's conceptual representations.

### B. Research

The research took place in real class conditions. Took part six elementary school students, eleven years old, who consisted two work groups, divided by gender. The research initiated by the study of conceptual representations. In order

the conceptual representations to be emerged the researcher used personal questionnaires and interviews [7]. A questionnaire of twenty questions, gradually more demanding was given to every student. There were many types of questions as open questions, semi-open, closed, multiple choice [6]. After the questionnaires was filled in, students took part in personal interviews where answered to questions about the answers given to the questionnaires. The answers of the questionnaires and the interviews were organized using the statistical software SPSS [4]. Then, a course was designed that took under consideration these representations.

#### IV. RESEARCH ANALYSIS

##### A. Study of Students' Conceptual Representations. Conclusions

In the following paragraph will be presented the students' answers about critical aspects of World Wide Web and the researcher's conclusions.

All students have a personal computer at home. They don't take computer lessons but they use their computer in many different ways, such as navigating in World Wide Web in order to search for information and games.

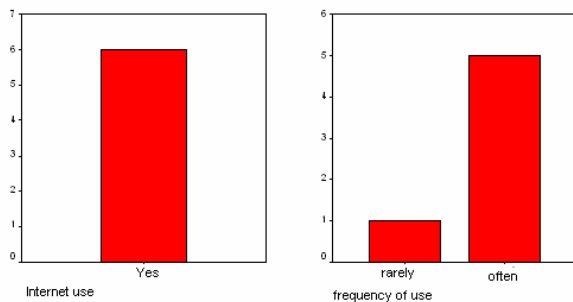


Fig. 1 Frequency of Internet use

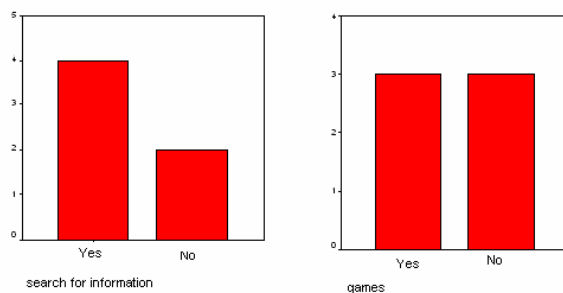


Fig. 2 Reasons of Internet use

Students know about the technological means demanded to access Internet and that they are able to access through it to any kind of information, in any language. Though they ignore where information is being stored and how to search for them.

Also they consider that all information in World Wide Web come from experts, so that they are valid and updated. Finally they totally ignore the concept of "Intellectual Property

Rights".

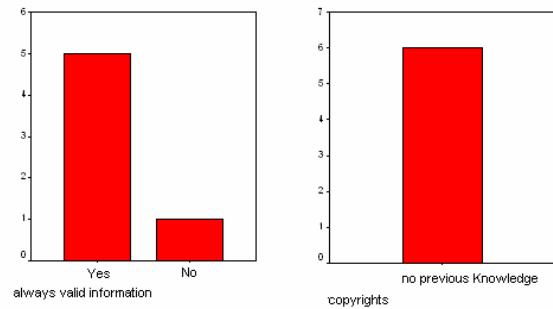


Fig. 3 Credibility of Internet information, Copyrights

##### B. Setting Didactical Goals

From the above became clear that a course based on the conceptual representations of students should help students to construct knowledge about the following: What is World Wide Web, where information is being stored, who publishes them, how does someone search for them, are they always valid and reliable, what is Copyright protection and management?

In details:

The general goals that the course set for students to achieve were:

- To accept World Wide Web as a source of information
- To become familiar with ways of searching information through it
- To evaluate the credibility of the information given from World Wide Web
- To embrace the use of World Wide Web an every day practice

The specific goals that the course set for students to achieve were:

1. To perceive the concept "World Wide Web»
2. To be connected to the Internet using an Internet Service Provider (ISP)
3. To use a web browser
4. To search using an URL
5. To choose key words
6. To use search engines
7. To perceive concepts as "Intellectual Property Rights" and "Copyright protection and management"

#### V. IMPLEMENTATION

##### A. Implementation of the First Specific Goal

• The teacher/researcher gives a printed page of an e-dictionary and asks students to find a synonymous of the word Internet

• Among others students find the synonymous "World Wide Web"

• The teacher/researcher gives the photo of a spider net

• Students are being asked to connect two spots on the net in different ways. Initiates discussion about all possible ways to make the connection

- Discussion leads to why is being used the model word “net”

- Through dialog are being explained the following:

1. Computers are being connected as a net
2. Anyone can use them to publish anything
3. A telephone line is necessary

#### B. Implementation of the Second, Third & Fourth Specific Goal

- Students are asked how they could be able to access these sites.

- Teacher compares an address to a URL
- Teacher demonstrates the process of dial up connection and the main functions of a web browser
- Students repeat the process for other suggested sites (The sites accessed were: <http://www.stratari.gr>, <http://www.miliascamps.gr>, <http://www.gefyra.gr>, <http://www.hcm.gr>)

#### C. Implementation of the Seventh Specific Goal

Students access prechosen sites where is emphasized that their content is being protected by the laws of Intellectual Property Rights (<http://www.culture.gr> - <http://www.in.gr>).

- Is being discussed the matter of Copyright protection and management
- Teacher calls students to compare the copyright protection of the content of a site to the copyright protection of a book

#### D. Implementation of the Fifth and Sixth Specific Goal

Teacher selects two articles of a children’s magazine.

- Every group has to find out the key words of each article and to use them in order to discuss the articles to each other.
  - Through discussion the teacher explains the use of the term “key word” in World Wide Web.
  - Teacher demonstrates the use of a key word in a search machines
    - Students do the same using the key words that had chosen from the articles
    - Every group study the search results and chooses the most proper. They visit the sites and evaluate the information given.
    - Then they visit a prechosen site (<http://www.geocities.com/makedonia007/>) that publishes historical information about Macedonia. They compare that information with history books realizing that the two sources are totally different.
    - Initiates a discussion about the credibility of a site. Who publishes the information of a site? Is he/she an expert? Is it a formal site or a personal one? Is a published book more trustworthy and under which conditions?

Note: The didactical goal materialized in the order above in order to follow spiral sequencing [3].

#### E. Using World Wide Web in school life needs. A Qualitative Evaluation

In order to evaluate in a qualitative way the course results teacher tasked students to collect information for an ecological program that were taking part in. Among different aspects of ecology decided to search information for genetically engineered seeds and a pine tree forest, under protection, in their area. They used Internet Service Provider, web browser, search engines and key words, visited proper sites (<http://6gym-patras.ach.sch.gr/ergasia/ddasos.htm>, <http://www.greenpeace.gr>), evaluated information, images and used the chosen ones making a poster in which the sources of information and images were referenced, in respect to copyright regulations.

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