



E-Learning for Simulating the Web Server Functionality

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Abstract: In this fast growing world, almost everything becomes computerized. It becomes easy and more efficient, when it is computerized. It is more effective, when this technique is implemented in teaching. This computerized learning makes the students to learn and understand the concept easily than theoretical teaching. Theoretical teaching is best when the students are participated in direct learning system. And also, they understand only the simple concept well and it is complex to understand the complicated concept.

The process of teaching through computers or online is termed as "E-Learning". It makes the student to understand all tasks in an easy way. The process of E-Learning is done by representing the concept in Graphical-Oriented or in Pictorial-representation. The E-Learning process is more useful for the student who wants to learn through the Distance-Education systems. This kind of learning is also defined as Teaching in Virtual Classrooms. The advantage of this virtual classroom teaching is that the student can acquire knowledge at any time and from any places. A snapshot on E-Learning process using the Simulation technique is discussed in this paper. In this paper, the technique E-Learning is applied to explain the functionality of Web Server.

Keywords: Computerized, Direct learning system, Distance-Education Systems, E-Learning, Graphical-Oriented, Pictorial-Representation, Theoretical teaching, Virtual Classrooms, Simulation technique, Snapshot.

I. INTRODUCTION

Teaching is important to improve the knowledge of students. While teaching some tedious or complex concept, it is difficult for the students to understand. To improve this environment, some technique is needed. In this paper, the technique of computerize the teaching process is adopted. This technique represents the concept in graphical manner and so it explains the concept more easily and makes the students to understand clearly. This technique is implemented in the field of E-Learning to help the students who are learning through distance education.

In this paper, the E-Learning technology is implemented to simulate the web server functionality. Web Server is one of the leading concepts in this technical world. To explain this web server functionality to the students theoretically may lead to some drawbacks. The Web Server technique is implemented in the networking concept.

The networking is the process of exchanging information between two hosts. These hosts are referred to as Client and Server. The client sends request to the server and the server executes the requests and sends the result back to the client. The manual explanation of the process done by the web server makes the students to feel the concept difficult, since it is explained on theory basis and so the students makes several assumptions to understand it depending upon their capability. Some students make wrong assumptions. In that situation, it becomes so complex to clearly explain the concept theoretically.

To avoid this type of wrong assumptions and to make the teaching process efficient, it is better to implement the simulation model of web server functionality in E-Learning. In E-Learning, this complexity is reduced by representing the flow of execution of the program in a graphical way.

This graphical representation is termed as Simulation. The process of this simulation model is explained below:

- A. When the client sends request to the web server, they execute the default path of the web server to check the activation of the web server through by getting the appropriate content of the web server.
- B. If the content is not displayed, then the client concludes that there is no web server available and so they wait for some time.
- C. If the content is displayed, then the web server is available and then the client sends their request.
- D. Then the network travel to the server carrying the request of the client.
- E. Thus the server receives the request and then processes it and send the response to the client.
- F. The process is repeated by interpreting the client with the server by sending the request and so the server sends responses to all clients' interpretation.

These processes are represented in a simulation model and thus the students can able to learn about the functions of the web server and also about the process of the web server. Through this process, they got a clear idea about the functions of web server and the web program and thus the concept is easily understood by the students. Thus the E-Learning becomes useful in the field of teaching using simulation model and also helps the students to learn more and to improve their knowledge.

II. RELATED WORK

To implement the concept of simulation model to explain the process of web server in the E-Learning technique, we analyze the works done by other researchers which are related to E-Learning. The papers we referred are given below:

In paper [1], they describe an e-learning system with a real system and simulator for studying embedded system. Proposed e-learning system in that paper provides learners with three items for studying embedded system. First one is on-line textbook. Second one is a graphical simulator, and third one is a real system. The simulator consists of microprocessor and its peripheral circuit. The real system consists of same composition as a simulator and is connected to the internet, namely it is a remote experimental embedded system. The simulator is used for the verifying the programming and for understanding the theory of embedded system operation, namely it is used for exercise. The real system is used for the experiment to check the real reaction of the system, namely it is used for experiment. Therefore the learner can study embedded system regardless of location and time. Moreover they can learn even if they do not have a real system. Thus they do not have to prepare any equipment needed for developing embedded system.

E-learning offers potentially universal access to "best-in class" content, regardless of location, and it can transform education and training from a passive consumption experience to a more flexible and student-centered experience as in [2]-[6].

In paper [7], they presented an evaluation study of an IEEE 802.11b wireless LAN (WLAN) applied in E-learning classroom. The simulation is conducted using OPNET IT Guru 9.1. Also, in that paper presents a simulation study to estimate the appropriate number of E-learning clients that can be supported in the WLAN as well as the user-perceived Web response time as a function of network load. Their simulation results show that an IEEE 802.11b WLAN can support up to 50 clients with modest E-learning and Web browsing activities. Wireless access points are now common place on many areas such as: homes, airports, university campuses [8, 9, 10, 11].

There is a growing literature on wireless traffic measurement and Internet protocol performance over wireless networks [12, 8, 9, 13, 14, and 11]. For example, Tang and Baker [14, 11] discuss wireless network measurements from two different environments: a metropolitan area network and a local area network. More recently, Balachandran et al. [12] report on network performance and user behavior for general Internet access by several hundred wireless LAN users. They find that for this set of technology-literate users a wide range of Internet applications are used, user behaviors are diverse, and overall bandwidth demands are moderate. Kotz and Essein [10] characterize campus-wide wireless network usage at Dartmouth College focusing on infrastructure mode using access points.

In paper [15], the *Semantic Web* is the emerging landscape of new web technologies aiming at web-based information and services that would be understandable and reusable by both humans and machines. *Ontologies*, generally defined as a representation of a shared conceptualization of a particular domain, is a major component of the Semantic Web. It is anticipated that Ontologies and Semantic Web technologies will influence the next generation of e-learning systems and applications. The aim of the paper is to explore topics related with the

new opportunities for e-learning created by the advent of Ontologies and the Semantic Web.

In paper [16], the important aspect of Web Intelligence (WI) in AIED research is explored. WI enables course sequencing and material presentation not only according to the learner model, but also according to the most up-to-date relevant content from the web. In paper [17], they entitled "What can the semantic web do for Adaptive Educational Hypermedia?". Towards this direction the paper demonstrates how LAOS, an Adaptive Hypermedia (authoring) framework can be used in the context of the Semantic Web.

"The New Challenges for E-learning: The Educational Semantic Web (invited)" Lora Aroyo, and Darina Dicheva, outline the state-of-the-art research on Semantic E-learning and suggest a way towards the Educational Semantic Web in paper [18]. They propose a modular semantic-driven and service-based interoperability framework and related ontology-driven authoring tools. In paper [19], entitled "*Ontology Enabled Annotation and Knowledge Management for Collaborative Learning in Virtual Learning Community (invited)*", Yang, Chen, and Shao propose a framework for ontology enabled annotation and knowledge management in collaborative learning environments. Personalized annotation, real-time discussion, and semantic content retrieval are the three main elements of the proposed semantic web services.

Henze, Dolog, and Nejdil in their paper "*Reasoning and Ontologies for Personalized E-Learning in the Semantic Web*" propose a framework for personalized e-Learning in the semantic web and show how the semantic web resource description formats can be utilized for automatic generation of hypermedia structures in [20]. They investigate a logic-based approach to educational hypermedia using TRIPLE, a rule-based query language for the semantic web.

In [21], entitled "*Ontology-based Organizational Memory for e-learning*", Abel, Barry, Benayache, Chaput, Lenne, and Moulin present an ontology-based document-driven memory which is particularly adapted to an e-learning situation. They provide a thoroughly discussion of a learning organizational memory and they focus on the ontologies on which it is based. Their research work is situated at the crossroad of three domains: knowledge engineering, pedagogical design and semantic web and they provide interesting insights.

Moreale and Vargas-Vera in the paper[22], entitled "*Semantic Services in e-Learning: an Argumentation Case Study*" outline an e-Learning services architecture offering semantic-based services to students and tutors, in particular, ways to browse and obtain information through web services. They present a proposal for a student semantic portal providing semantic services, including a student essay annotation service. They also claim that visualization of the arguments presented in student essays could benefit both tutors and students.

In [23], entitled "*Semantic description of Educational Adaptive Hypermedia based on a Conceptual Model*", Papasalouros, Retalis and Skordalakis present how the outcomes of the Conceptual Design stage of a method for developing Adaptive Educational Hypermedia Systems can

be encoded using RDF-based ontologies. They focus on the development of a tool for the translation of OCL rules to RuleML to facilitate the automatic transformation of UML models to Semantic Web descriptions beside XSL Transformations.

In recent years Mashups are increasingly found in the eLearning field to offer instructors the opportunity of Linking students to multiple sources of information as well as offering students the ability of accessing learning tools and services in an easy manner. In paper [24], they described the design and implementation of our Mashup web application that offer the SimpleScalar simulator as an eLearning web-based service for the students of Computer Architecture course. This Mashup overcomes the problem of platform and hardware dependency of SimpleScalar and can be accessed from anywhere. They added new service to SimpleScalar in our Mashup web application that is generating visual statistical results.

In that paper [24], they discussed about Simple Scalar simulator [25] that's very vital in Computer Architecture field and apply the techniques of eLearning to it. Besides simple scalar we also include the benchmark SPEC CPU2000 [26]. Applying distance learning solution does not prevent the students training on simulators or any application that is used in campus-based education [27]. An eLearning system is a group of functions, elements and components mixed to give a good and robust learning experience, eLearning systems form a huge agglomerative class room where students are able to discuss issues, share opinions, share media and share anything is kept logged, this means nothing is forgotten or lost [28, 29].

Another aspect of Web 2.0 concepts interesting in the context of E-Learning are Web Sharing Applications [30]. Usually cooperative work reaches better results because it places bigger potential on a defined case, eLearning gives this opportunity by offering place, management tools, and a big library of resources[31,28].

In [32], For the design of new applications in the information and communication technology (ICT) area with ever shorter lifecycles, the availability of the most recent knowledge is mandatory. The intervals within the acquired knowledge bases therefore have to be updated, become shorter and shorter. In this paper we present a new interactive web-based training system supported by the European Union to strengthen the knowledge of the personnel in industry and universities involved in this area. The training system consists of three course modules together with a special adapted web-based training platform. These course modules were developed together by designers from industry and universities to account for the special needs of these groups.

III. METHODOLOGY

A. Proposed Method

The aim of the proposed method is to explain clearly about the functions of the web server by creating simulation model in E-Learning technique.

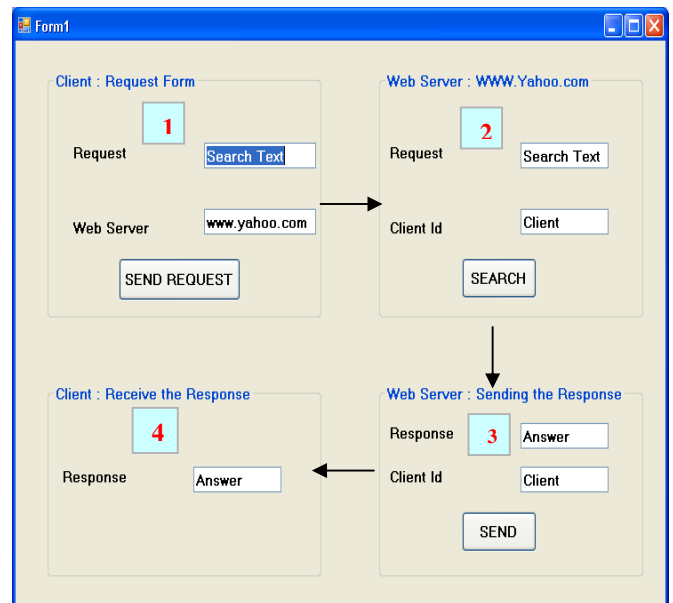
The summary of the proposed method is as follows: The web server is one of the most leading technologies in

the education field. Explaining the functions of the web server by demonstration is well understood by the students, comparing to theoretical explanation. The simulation model is created to explain the functionality of the web server.

The simulation model contains two modules in a window, one act like client and other act like server. It contains four processes to explain the model which is discussed below: The client sends a request to the appropriate client by using two textboxes. The client sends the request by clicking the button. If the requested client available, then the server receives the request with the client id which is all displayed in the textboxes and start search for the response. Otherwise it informs it to the client that the "Web Server not Available". After completing the search, the server sends the response back to the client by using the client id. The response and the client id are given in the textbox and they are sent to the client by pressing the button. Thus the client receives the response for their request.

Thus the processes done by the client and the server are explained to the student through simulation model by creating four functionalities.

The simulation model looks like:



- [a] Client sends Request to the server(Yahoo)
- [b] Server (Yahoo) searches for the client request
- [c] Server sends the response to the client
- [d] Client receives the response

Figure-1 Simulation Model

B. Procedure

Step-1: Student starts the client by activating the client window

Step-2: A window contains tools to type the request and send to the appropriate web server.

Step-3: A Simulation method of receiving the request by the server is shown to the student.

Step-4: Server searches for the response.

Step-5: Server contains the window with tools to send the request to the client who sends the request.

Step-6: Finally the client receives the response in the client window.

Step-7: Stop the process.

This procedure clearly explains how the simulation model is prepared to explain the functionality of web server through E-Learning.

IV. EXPERIMENTAL RESULTS

The simulation model is implemented to open a file from the browser. The student searches the server in the browser by giving the default server path like yahoo.com or google.com. When the browser opens the server's default page, the student provides the name of the file or keyword about the search in the respective place to initiate the search.

The server processes the request and detects the appropriate solution for that request. Then the server sends the result back to the student by displaying the content of the file. The content is displayed as a copy of the original file. That is the content is displayed line by line as in the original file. Thus the output of the search produces the complete set of file and it becomes easy for the student to understand the complex task itself. This technique also implements the concept of virtual knowledge sharing.

Thus, implementing the simulation model in E-Learning to explain the functionality of the web server is successfully done in this paper.

V. STATISTICAL DATA

A statistical report by comparing the theoretical classes and the simulation method is shown below. In this the report, it shows how the students gain knowledge through this simulation model. Number of students analysed for this report is 150 approximately.

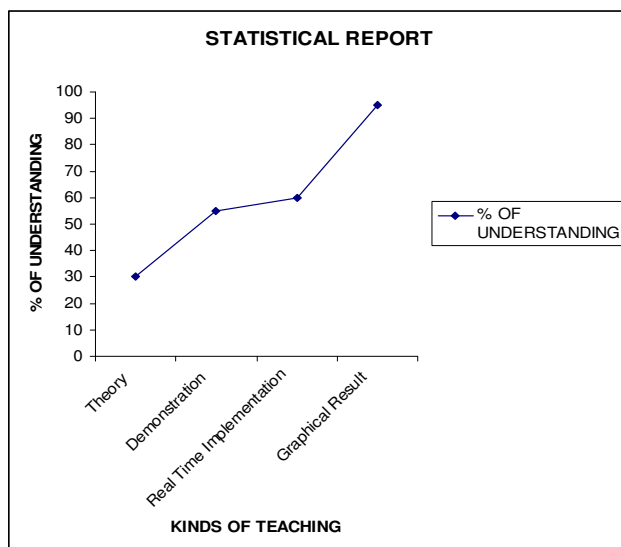


Figure-2: Comparison Chart

VI. CONCLUSION

The aim of the paper was to provide a virtual education to the students which will help them to learn and understand the concept easily at any time and at any place.

In this paper, the E-Learning concept is used to simulate the functionality of the web server. The simulation involves in representing the functionality and its process in graphical representation. This is explained in detail in this paper. Also, the statistical report is produced by analyzing the ratio of understanding the concept in different kinds of teaching by the students.

In future, this concept is well tested and implemented for all the other technology and extends the process in large scale to improve the progress of E-Learning.

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