

Network Based Education to Statistics Education

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Abstract

Virtual Education is a set of techniques created to help Presential Learning. In this paper we propose a set of systems based on Web to reinforce, help and motivate statistics students from the Federal University of Paraíba (UFPB) - Brazil. This set is composed by seven systems: monitor chat, virtual monitor, virtual library, virtual study, virtual classroom, radio and TV on Web. This project comprises high-end systems, high-speed networks and professionals of several human knowledge areas. The union of these systems could help the distance and present statistics education to transmit conferences and to spread benefits and applications areas of statistics.

1. Introduction

Networks as the Internet have producing good results in education support, stimulating the communication between students and teachers and increasing educational and cultural exchange [6]. Moreover, networks utilization makes possible collaborative learning and also learning about collaboration [3]. By the other side, educational systems should not only make available the usual tasks and information by digital media, but the use of new approaches to help the learning and increase students motivation are necessary too [4]. In these approaches, the student is the focus of the learning process and there is a differentiation related to his behavior once he is part of a collectivity where he influences and is influenced by [12].

In spite of the several teaching approaches, students' motivation to learn is still the most important point of relevance. This work proposes a learn/research/teach environment to increase the interaction between student-school, student-student and student-teacher. The goal is stimulate and improve students' knowledge, and it could be directly or not directly related to their course. By pedagogic point of view, the availability of different learning data and interactive tools increases the student motivation in many subjects by the facility to access research and learning structures. The same way, the

relationship student-student and student-teacher enriches the individual and collective knowledge even if they are physically separated.

2. Virtual Learning

Usually, there are two types of education: Presential Learning and Distance Learning. One definition for Distance Learning (DL) is: an organized and systematic way of self-study where the student learns from the material showed to him and is assisted by a group of teachers. Using the media is possible to do this from far. The opposite of Distance Learning is Presential Learning (PL) where students and teachers have real contact [10]. In the last years there is a third type of learning emerging: the Virtual Learning or Virtual Interactive Learning (VIL). VIL utilizes ways to break the distances and turns possible a better learning and no matter if the student is near or far from the educational institutions [17]. It is important to remember that the distance could be temporal or spatial.

3. Technologies Available

The main characteristic added to the DL was the use of computational systems to connect students and teachers virtually. This made possible the creation of Virtual Training Systems, Virtual Schools and Virtual Colleges. New technologies based on Virtual Reality have helped to a better relationship between student and teachers in non-immersive environments with interface configurable by the user [11, 18]. Other types of virtual environments use the Virtual Reality Modeling Language (VRML) for a synchronized communication in 3D, like the Holodesk Communicator browser [9]. In this kind of environment, each user is represented by an avatar and can interact with other users by a textual or audio chat, what allows a collaborative and visual learning [15]. Another very interesting solution to distance courses and student-teacher exchange of information are the

environments with real-time video to stimulate the interactivity [8].

One of the possibilities in networks utilization for Educational purposes is the co-authoring of courses with teachers from different institutions [5]. This kind of co-authoring increases the course level and increases the quality learning. The utilization of several technologies to construct courses and the particularities of authors contribute to enlarge the student's vision of a subject and make possible the interaction with several instructors and their different visions about a subject. In this context, other interesting tool for DL is teleconference, where students can watch lessons given by distant instructors. When teleconference is used in PL, it allows collaboration learning between several institutions.

4. Implementation

The tools for *Learning Support* proposed here can be utilized to improve the classroom learning or to teach a subject or course in distance learning. Nowadays we can observe DL technologies been used to help the PL.

Specifically for the Statistical Learning, we propose some interactive or not interactive tools to support Presential Learning. This tools are: the Statistics Radio, the Statistics TV, the Monitor Chat, the Virtual Monitor, the Virtual Library, the Virtual Study Room, the Virtual Classroom and the Statistical Software based on Web.

Each one of these subsystems is part of a single project: the Laboratory of Technologies to Virtual Learning of Statistics – LabTEVE – of Statistics Department in Federal University of Paraíba – UFPB - Brazil. LabTEVE will be composed by a computer cluster, with heterogeneous operational systems (Linux and Windows 2000), as showed in the Figure 1. Cluster of computers connected by a Gigabit ATM switch is a good solution for complex systems, which require delivery and storage of amounts of data, as video, audio, etc [14, 16].

4.1. Statistics Radio

The Statistics Radio is dedicated to the Statistics learning with programs and discussions about statistical courses (graduation and pos-graduation). The programs will be transmitted “live” with statistics applications, seminars, debates, answers about exercises resolution, music selected by students association and others.

This system works on a dedicated server and has an Intranet for the radio station. It is composed by three workstations for the production and edition of programs.

4.2. Statistics TV

The Statistics TV is dedicated to the Statistics learning with programs and discussions about statistics produced by students, teachers or Brazilian educational TV's for general public. It will be the basis of future distance courses of statistics for graduation and pos-graduation levels. The programs will present lessons, national and international conferences, seminars, reprise of teleconferences, interviews with relevant persons of the statistical community, answers about exercises resolution and cultural programs (managed by students association).

This system works on a dedicated server and has an Intranet for the TV station. It is composed by three workstations for the production and edition of programs. The Statistics Radio and TV, in their early stages, are based on free versions of Real Networks software on streaming technology [13] and can work with 25 client connections at the same time.

4.3. Monitor Chat

The Monitor Chat is a textual chat dedicated to distance students of Statistics course. It is based on the *EveryChat* free software [7] and can be segmented by courses. Monitor students will share their time to chat and to work in real study rooms helping the distance students. This chat will be available every time there is some monitor student working. This system works on a dedicated server and has an Intranet. It is composed by eight workstations for monitor student's work.

4.4. Virtual Monitor

The Virtual Monitor is an intelligent system to support the learning. The students must download this system from Statistics Department homepages. This system intends to help the students when they cannot access any other kind of help. It is a double system, which contains an expert system to answer questions about a subject and short statistical software. In addition, this system can be utilized to help the exercises solution. This system is under development and it will be available to download from the Statistics Department homepages.

4.5. Virtual Library

The Virtual Library is composed by a database with didactical material, as books, reports, etc., i. e. any kind of material which can support the learning of students of statistical courses. These materials will be inserted into a repository like URLib [2], which uses the format of BibTex files to make references to the materials deposited within it. The Brazilian National Institute of Space Research –INPE – utilizes the URLib since 1999. In this collection, is possible to do a search by author, title, and

year of publication. The material can be consulted on-line or downloaded to student's computer for off-line consults. This system is free and can connect several locally and remotely distributed repositories, unifying the books collection and making unnecessary files transference.

This library must works 24 hours per day and this system works on a dedicated server or on a dedicated Intranet, if the collection was large. The URLib system allows decentralized management and each server could store specific subjects.

4.6. Virtual Study Room

The Virtual Study Room is a virtual room where students can discuss subjects of the interest of courses, with or without the virtual presence of a teacher. This room is similar to a real study room where students can interact with others students. Avatars represent people in this virtual room: *avatar* is a human representation into a virtual environment. The avatar modeling is done according to real physical characteristics of each student. The interaction between individuals is made by a textual or audio chat, offering a visual and collaborative learning [14].

4.7. Virtual Classroom

The virtual classroom will be a triple environment, which contains a teleconference environment based on Web, a visual chat and a textual or audio chat. In the teleconference environment, students will watch classes in real time. Four teachers will be in the virtual classroom: a teacher teaching the lesson by teleconference and three teachers for support. The first teacher uses multimedia resources as video, cartoons, etc. to explain the lesson. The other three teachers must remain in a textual or audio chat to solve on-line students questions. If several students have the same doubt, these teachers can solicit to the first teacher to answer the question to all presents. The students can interact with others by a visual chat, which contain a virtual representation of the classroom and students.

A great advantage of this kind of classroom is the possibility to save a lesson and to construct a personal virtual library about a subject. The lessons will stay available in the Virtual Library in digital format for download.

4.8. Statistical Software based on Web

Several statistical software are available on the Web. Some, as Rweb [1] are free and can be accessed from its original URL or can be downloaded and installed at local servers for better performance. These systems can help students, which do not have access to common

commercial statistical software. Once they are available on the Web, they can offer low-cost training in opposition to commercial systems, which need high cost of acquisition, maintenance and actualization. These systems will be downloaded and installed in a dedicated server. It will work 24 hours per day allowing remote or classroom access for students and teachers.

5. Conclusion

We pretend modify the form of local learning with the implementation of these systems to help teachers and students. It will facilitate the learning for several students of several courses mainly by the rich variety of learning support. This project stimulates and motivates a lot of people in the department once they could work at implementation and maintenance of the subsystems. As these technologies require the union of a few human knowledge areas, this fusion is the mainly characteristic of this project. It implies in several opportunities of training and research for students of different areas and levels. We must to note that the presence of students in maintenance and management of these subsystems will be also a font of improvement of their knowledge.

Mostly of these concepts increase the quality of learning immediately after implemented. It can be observed in the Statistics TV, Statistics Radio, Monitor Chat, Virtual Monitor, Virtual Study Room and Virtual Classroom. For the Virtual Library a reasonable collection is required. But, once it is linked with others libraries, search and consults are available since its implementation.

6. References

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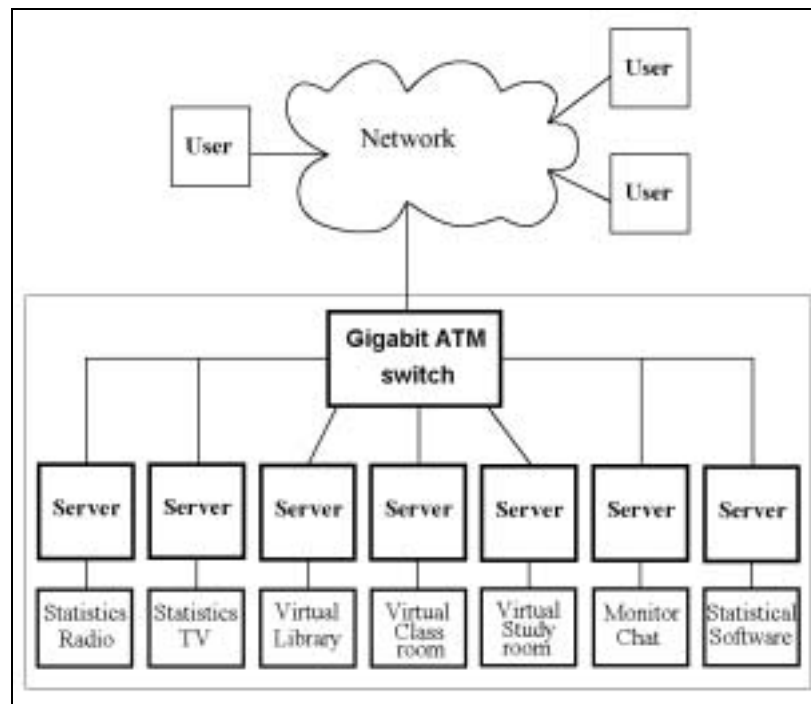


Figure 1 - LabTEVE: A cluster of workstations connected by a Gigabit ATM switch.