Peer-to-Peer Just-In-Time Support for Curriculum Based Learning

Rainer Bezzina Supervisors: Dr. Kevin Vella, Dr. Chris Staff

Introduction

In every learning situation, almost all students, at some time or another, come to the point where extra help is required to overcome a specific obstacle. Usually, since the learning session is delivered by a teacher physically present amongst his students, the problem can be easily tackled by further explanation, during or immediately after the session.

Due to the considerable number of students per class, and the subject matter teachers are expected to deliver, teachers in typical school environments are not usually able to support each and every student with all his or her difficulties. Furthermore, students who require a lengthy explanation usually find that the teacher does not have sufficient time available for individual attention. Worse still, if the student is too shy to ask his humble question, the effectiveness of quality learning and quality teaching will be completely lost. Nowadays, with the introduction of a wide range of learning methodologies, including distance learning, and video streaming over the Internet, the learning student must somehow be in a position to interact with the teacher to get the required support.

Taking the above into consideration, in our project we attempted to create an Internet based student support system, where the learning student is not only able to retrieve the already available help but also ask teachers in a completely anonymous and secure environment.

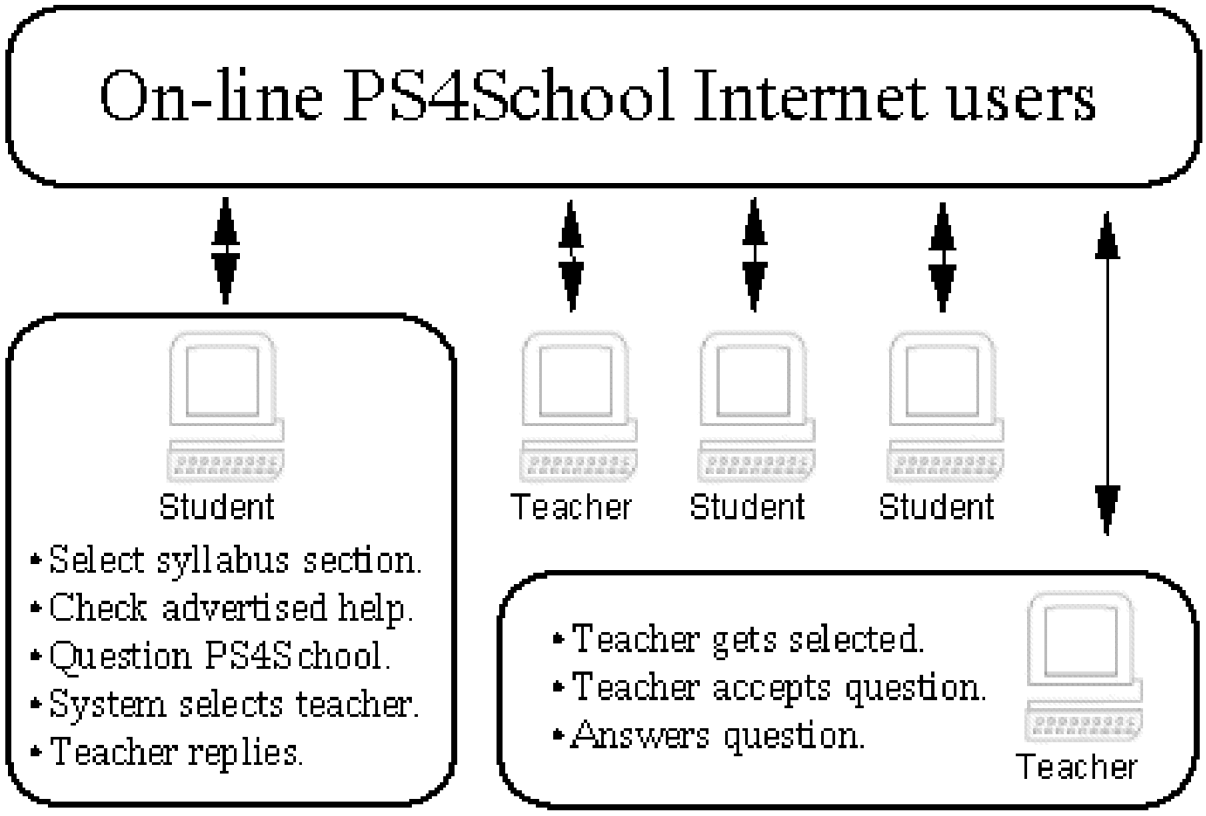

Figure 1. PS4School generic architecture

Objectives

This project's major target was to create a student support system, where students are able to get the required help from other on-line teachers over the Internet. The system was designed for Secondary school students who follow a fixed set of syllabi. The following were the principal objectives:

- Students should be able to get help instantaneously from the system.
- All interactions between the users are to be recorded and sorted for later usage.
- Users can select different interaction session types, such as Chat, Question and Answer etc.
- Students and teachers should be completely anonymous to each other.
- A load balancing scheme must applied between all the available teachers.
- An ad-hoc Peer-to-Peer network model, with no centralised server is to be used.

Project Methodologies

The Peer Support for School (PS4School) system is initiated by connecting the user to the rest of the PS4School network over the internet. Once connected, a common user can browse through the locally available syllabus structure and find the section about which he requires further support. If the section is still not defined on the users' local system, the user invokes a search and further sub-section information is received from other peers. For each section, the user receives also a set of remotely available help sessions. If the user is interested in a particular help session, he downloads the session and views it. If no help sessions are found or the sessions did not provide enough help, the user is able to start a new help session with an available teacher. After typing in his question, the system searches for the optimum teacher using a load balancing scheme. If the teacher accepts the question, an interaction session is initiated between the student and the teacher. Finally, the whole interaction session is stored. Apart from implementing a complete working solution, PS4School was developed in a very rigourous structure to enhance further system development.

Results and Achievements

The primary objectives of the project were successfully achieved. PS4School allows teachers and students to help each other over the Internet. The developer interface for developing new types of interaction media was successfully created and was also used to develop custom media types. Although the system does not implement a high security policy, it still provides completely anonymous interactions between students and teachers. After testing the system with a small network and a real syllabus, the overall system's performance, especially the load balancing scheme,was quite satisfactory. Since almost all simulated students who required some form of help were able to get a reply within a very short time frame, we may conclude that the project achieved all the expected results.

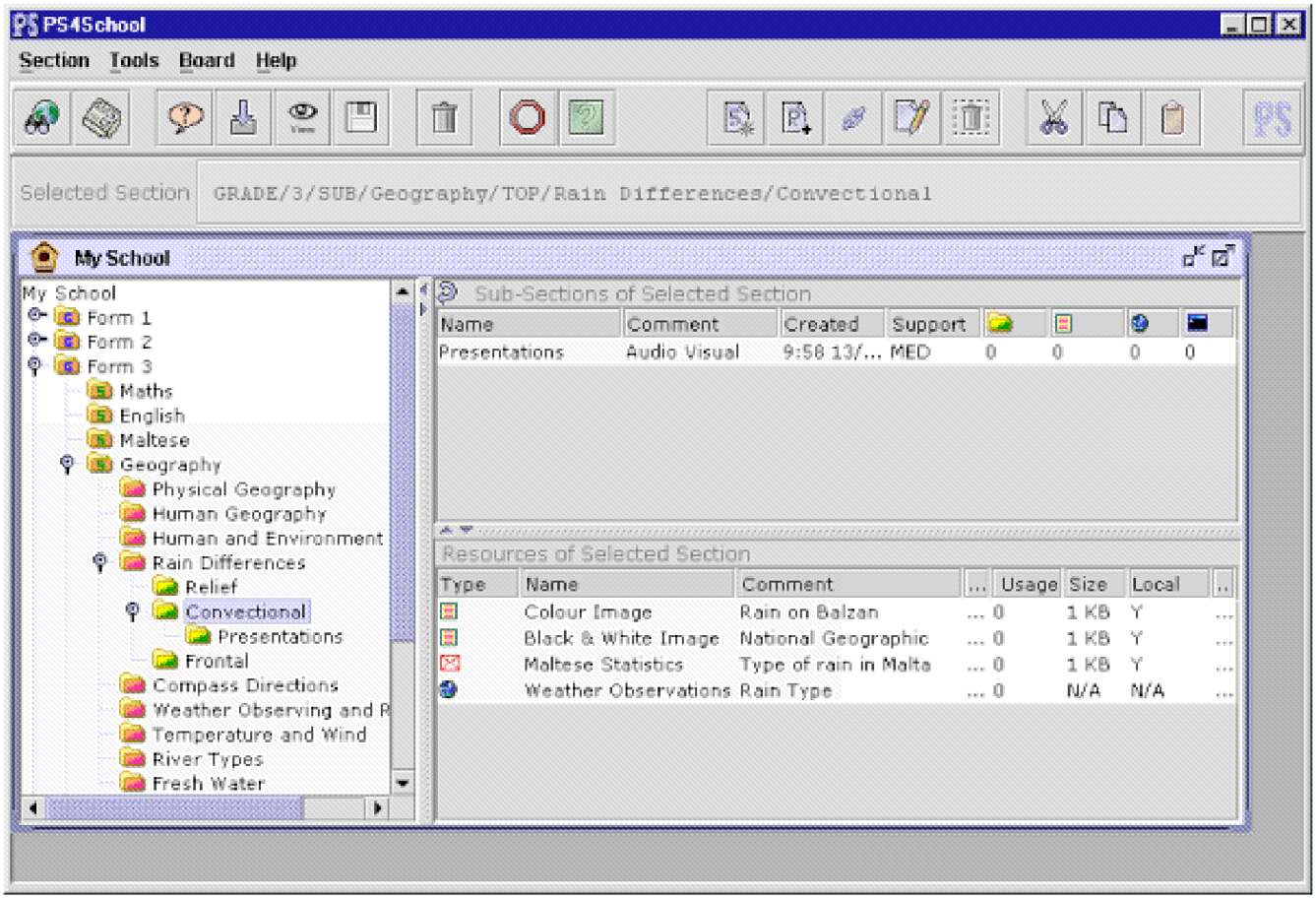

Figure 2. PS4School Application Screenshot