

CSchool Interactive Design

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Abstract. The design of an educational system involves a good understanding of the whole school environment; in order to give the correct approach of how to develop a comprehensive educational system as the real educational needs for its operation. This article describes a design model of an educational system based on the teaching methods applied in the Spanish primary and Secondary schools, which takes into account the new advances in technology while preserving the current teaching method of classroom, to ensure a quality teaching/learning process. This development has been done by combining components such as, Cloud Computing and Web Services. The proposed system is based on a systematic approach, where different phases are implemented, containing workflows and stages.

1 Introduction

The design and implementation of learning platforms are essential for the development and future perspective of information technologies and communication and knowledge management in teaching-learning process while preserving its quality. The school users and students' tutors (families) require an agile educative system in this respect, which in turn is capable of storing the large volumes of information that are managed during this process.

This is a catalyst that shows the urgent need to develop an effective, quality and ease of use, and according to user needs, teaching/learning process by combining new technologies for its development and approval, since, from our point of view, the more complex the system is, it does not have to be more difficult and complicated to use, that is done by taking into account all the needed factors, such as: way of work in the classroom, teacher-student, tutor-student, etc. when creating and designing the system.

Noteworthy that, our exposed research in this paper is the continuous of a large research line that we have started since more than 5 years, by creating two educational applications for schools: TabletNET [2] and eLearnXML [3], where we have combined them with the use of several technologies that we have worked with within the educational environments: Cloud Computing, Web Services; to finally create the new educational system: CSshool.

2 Project Definition and Necessity

From the educational point of view, the work at the school needs tools to act with the curriculum materials, to develop better the collaborative work by allowing teachers to organize better the presented teaching material using Information and Communication Technologies (ICTs) [4], [5].

Taking into account the status of School 2.0 system [6], it is possible to highlight the question: Which are the real necessities of the teachers in a daily classroom? This is the question that has guide our research work, which we present in this paper. Therefore, solving these necessities and how to make use of ICTs at the classroom become our two main keys. The environment in which our system will be applied, is as follows: the classroom; in addition to the equipment in the classroom, one tablet per student; tablet for the teacher; printer; projector; port replicator and finally, a wireless connection for the TabletsPC. Analyzing how schools are organized, we find different types of centres that combine several courses with groups of different levels, single track centres (just in one town) and others are distributed in several populations such as of the CRA (rural schools) [7]. Our first steps in the research were for studying evolution of ICTs in the educational environments, and after having several surveys and depending on European and American statistics, we found that the use of ICTs is in a constant growth at the classroom, but it still exists some problems, which are showing up with this growth. Some important weaknesses that have been found:

Low participation, between educational centres, in projects that make use of internet, almost just 8%; The communication with the parents of the students through internet, 26%; The elaboration of online resources for collaborative work, 30.6%; The evaluation of the students using ICTs, 32%; and finally the Communication with the families is so week.

Once these necessities have being shown, after performing many studies and research within Spanish centres [8], we find that there is a really need for the use of an application that facilitate these needs within the educational environment. But, because of the huge magnitude of the project and the requirements that we intent to solve, we find that we have to take into consideration several characteristics, like: flexibility of the system when new functionalities are incorporated, and making the system accessible from others systems. All these needs, leads us to make use of *Web Services* to achieve our goal, and of a new user interface of the system, to ensure its easy use and understand by the new users (parents, etc.).

As a result, the focus while creating the system was on: from one side, creating a bridge of communication with the students' parents; and in the other side, to facilitate the teachers' work in the classroom and the enhancements of the collaborative work between students.

3 CSchool Interactive Design System

In this section we present and identify the elements that support the CSchool system, starting its: architecture, functionalities and its user interfaces.

3.1 Architecture and Functionalities

While designing the system architecture, we took into consideration that the educational content and the activities of students are hosted in Web content managers. These Web services provide us the basis for the interaction of the users and the system content. Besides, the system must have an architecture that allows the access to it from any device, and a central secure system, with authentication, that allows the distribution and management of the content, providing flexibility by accessing it through the use of Web services.

The functions of the system are employed through the use of Web services. These Web services are points of input and output of the system, facilitating the communication between the different parts of the architecture. What we take value of and emphasize in, are of how the communication between the various Web services can benefit from the Web services communication in banking environment [9], so we can adapt it to our needs in this educational and information system.

The main parts of the system could be defined as cloud of services, some of them are: Storage logic, which provides the logic of the system files storage; School, provides the business logic; Services, it provides access to the system and generates accurate views of the information in the other clouds; Administrative, it is enrich with the received data from the educative environment part “School”, which provide the necessary data for the country’s education department to establish the students’ curricula; and finally the Evaluation, where the tools for the evaluation are.

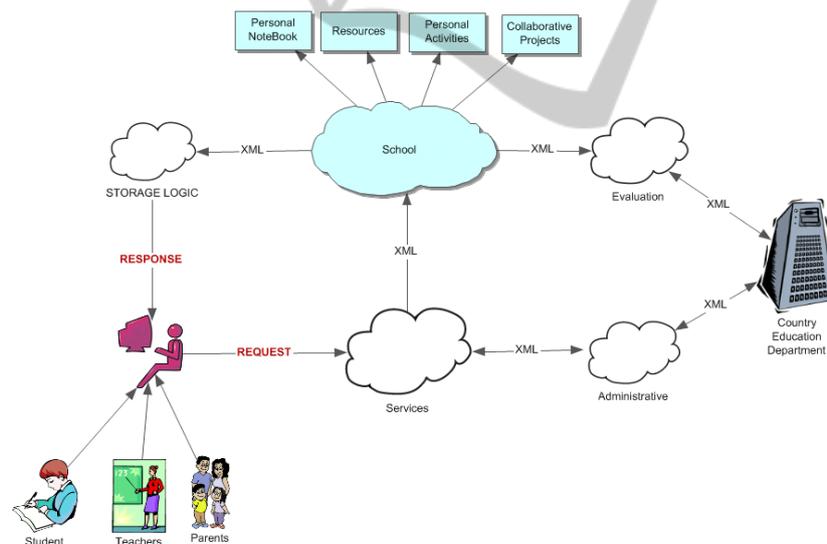


Fig. 1. Shows the location of the cloud of services between the different parts of the system, to obtain a dynamic system; Thus, its growth is through the creation of Web services to add new services, or Web services that allow the access to private or public clouds, of other educational entities, to assist in the educational world or who need to monitor the educational system itself.

The implementation of this architecture, see Fig. 1, favours the increase of services that could be deployed (or added) to facilitates the growth of it; also it leads to a bet-

ter communication, between the different parts of the cloud of services, as the information traffic, thanks to the support that the Web services technology provides them. At the end of this study, we noted the need to accommodate the business logic in separate layers. Thus, in the future we may choose to add new layers to the system, or other systems would need to access the existent one.

3.2 User Interface

Each educational system must be distributed in several applications that can give support to its different users, in our case, the principle users of the system are: Teacher, Student and parents.

Starting with the teacher application, we find that he must have access to an easy and dynamic, drag and drop, application with an amicable graphic interface, which contains all necessary elements, and could be extended for the inclusion of future features depending on his needs [2]. Also, it must provide him the final view for the development of the activity, from his side as from the student view, to facilitate the development and implementation of this activity [11]. In this section, it is presented some of the catches of the desktop application of the system, see Fig. 2, where the main interface with members of the educational community act while using CSchool, are presented. Where a special attention is given to the parts used by teachers and students.

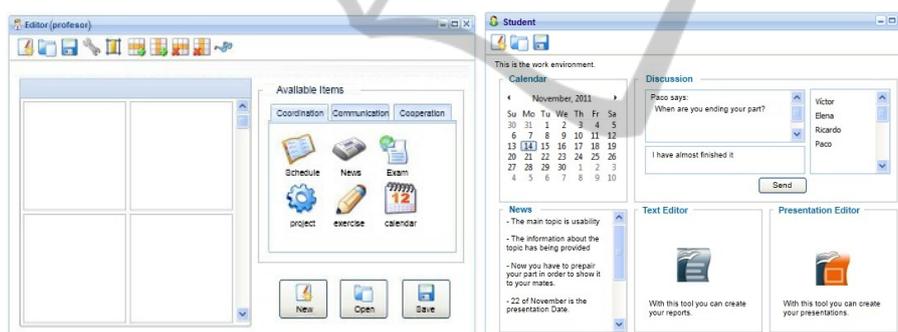


Fig. 2. This figure shows the two steps of the teacher interface, where the teacher, first, can select a number of elements to compose the activity for teaching process, and later, he can view the aspect of the student interface with the elements he has selected for him.

In the creation of activities in real life, teachers have all the options offered by their respective environments. To some extent, one of the weaknesses of computer systems is that, it is not easy to emulate the combination of the available resources. For that, in CSchool, we offer teachers the option of creating activities, in which he you can choose all the objects involved in them, from a text editor, to a discussion tool, presentations, calendar etc. more detailed information about the system design and work can be found in [2], [3].

During the development of the graphical user interface, we took into account, the new academic resources, and the incorporation of new users, students and teachers, to the school. For this, the interface is designed so the users can obtain a homogeneous

working environment and as simple as possible. Another point that was taken into account was the collaborative work between teachers and students. The graphical icons that represent the same action are identical at the teacher and student interfaces. And at the same time, a distinction between user interfaces for different user levels was done, so the teacher can have classify them depending on their educative level. And for this we have created different interfaces for downloading, browsing and sending documents, see Fig 3.

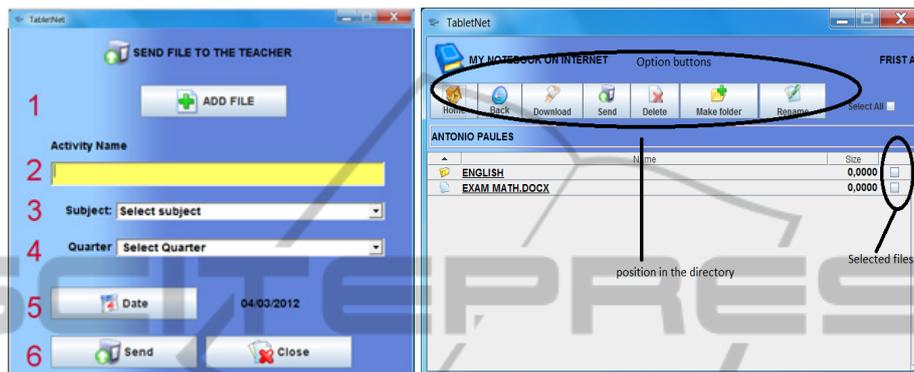


Fig. 3. These interfaces are for uploading and downloading files: Uploading documents sequentially on the same screen. After that the teacher can view the available options about the navigation between the documents previously uploaded to the system.

Another feature of the system is that it allows students and teachers to send their files using a private email account, and to access these files in an online way, as shown in Fig. 3, thanks to our use of the Cloud and Web Services. This makes possible that the system works as a multi-server application, in which it can access several servers in different physical locations, and it is here, where it is determined which type of configuration does the centre has.

4 Conclusions and Future Work

In this research work we have presented a new educational system of quality. Its new features make it a solid and an innovative system to be used by the scholar users (teachers, students, parents, etc.). It combines many new technologies, such as cloud computing and Web services to distribute better the information, access it, and work with it in an easy and dynamic way, also it was developed to support distributed user interfaces, which would make it a easy to use and interact with.

By supporting the ISO 9126-1, we prove that the system ensures, it complies to all the quality points, without losing any effectiveness of the traditional learning/teaching process, thus our main point still the creation of an effective and complete educational system, that schools can work with.

As a future work, we are working on the installation of this system within different schools in Spain, to test it and obtain a complete and professional feedback that can

help us to improve the system in its future versions. In the other hand, we are working in parallel to these results, to create a secondary application that will allow teachers and tutors, to control the student's application at classroom and home, by applying distributed user interfaces, to obtain more control over the student learning production.

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