

CY-ICER2012

Monitoring Students Moods for the Detection of Weaknesses in Secondary Schools

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Abstract

The education system is always being challenged by their limited capacity to adapt according to today's realities. In this paper we present a new methodology where teachers take into consideration the students' perspective to find weaknesses in the educational system. By using this method, the system is capable to have a broad view and can adapt the school to meet the incredible pace of technology change. Our proposal here is to create a platform that is able to collect information from students' moods, using RFID tags to represent three different moods. Students can click on them to express how they feel.

Keywords: Secondary School, RFID Technology, Students moods, New Learning Systems, Human-Computer Interaction;

1. Introduction

The education system is always being challenged by their limited capacity to adapt according to today's realities. In Spain, almost all schools have the so-called UTP (Pedagogical Technical Unit), whose role is, along with teachers, to monitor, evaluate and correct any academic teaching (Sánchez, 2010). Thus, UTP represents one of the most important agents to lead the changes. However, the UTP rarely provides the integration of new teaching practices to encourage students to participate in the teaching / learning process. This article discusses the ways for improving the classes and schedules through mood analysis of students making use of RFID technologies (Tesoriero, 2008). To do this, we got inspired by the very well-known sentence of John Kotter: "You cannot run the teaching / learning of the XXI century with twentieth-century methods and ideas of the nineteenth century." (kotter, 2009)

So, how to do it? Today, teachers take into consideration the students' perspective to find weaknesses in the educational system. Through this method, the system is capable to have a broad view and can adapt their school to meet the incredible pace of technology change, the events ,and all the processes occurring in this globalized and technology world. Our proposal is to create a platform that is able to collect information from students' moods, using RFID tags to represent three different moods. Students can click on them to express how they feel (their feelings). This platform is installed in all classrooms where students express their mood by pressing the active RFID tags. This press is captured by an RFID reader which is installed also in every class. Each student registered in the system can

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press the button that best suits to express his mood once the class has ended. In this way, the system recollects statistics that can be studied at the end of each semester to evaluate the teachers and the content of their classes. In spite of the fact that the teacher's authority must be reserved, teachers cannot act freely just because they got the degree or because they were appointed by someone to teach that class. Instead, the teacher must win it in the eyes of the students with teaching practices in line with the changing times.

The article consists of six sections: first, we start with an introduction to the educational system and its weaknesses. Second, we discuss the ways in which students can participate in the educational system process. Third, we introduce the RFID technology and the way in which it will be applied. Fourth, we talk of the platform: its features and functionality and how to address all areas of risk and its implementation in schools. Finally, we present a case study of the application in a kind of a regional secondary school and present the results. And last, we end the article with the conclusions and future work.

2. Educational systems and students participation

The real star of the educational system is the student; and almost all the tendencies of the current research work in education are to create tools and platforms that focus on the core of this education system: the students, with the purposes of making the students happy, comfortable, motivated and participatory to increase their performance. Nowadays, some teachers from the Spanish secondary schools are incorporating social networks as a tool for collaborative work and participation in class. An example of such systems is the Edmodo platform (Edmodo, 2011).

The question we may ask first is: do students really want to participate? Do current systems motivate enough participation?, or have they become obsolete because of the high interactivity outside of educational settings? We all, and students even more, have the rights to be heard, but asking students one by one would be an arduous task and this oral conversation would be difficult to be reflected and quickly accessed by any system. Currently the main possibilities of students in Spanish secondary schools are:

- Extra-curricular activities, which can be everything from travel to activities in the centre or in other places with cultural or professional interests. Normally, these activities are done outside of the teaching period.
- In school hours, the main activities developed are the classes and recess
 - Lessons specific to their course materials
 - Lectures on crosscutting issues primarily in tutorials schedules
 - In some centers recreational activities (sports, culture ...) are also organized during breaks.
- Satisfaction surveys and quality controls in secondary schools that have implemented quality procedures, carrying out surveys throughout the year to monitor the quality of teaching. Two surveys are normally carried out annually.
- Election of representatives.

Thus we see that the student satisfaction survey is done twice per year in schools.

3. RFID technology and the platform aspect

The measuring system of moods, in the classroom, is part of the RFID system to work with; there will be a system for measuring students per classroom, so that they can express their mood when entering and/or leaving the classroom, so every classroom will have a panel as shown in Figure 1. Under each of the three slides there is an active RFID tag to be selected by pushing it. The system communication is supported by a client-server application. This communication is based on a SOA architecture that allows users to store and retrieve information. Thus, when RFID tag identification (ID) is read by the RFID reader in the client device (the student will press the slide), the ID is sent to the server to be processed via a web service call. The server then turns this ID into a command or tool accordingly. Then, a command is executed on the tool resulting in a resource that is stored in the system database.

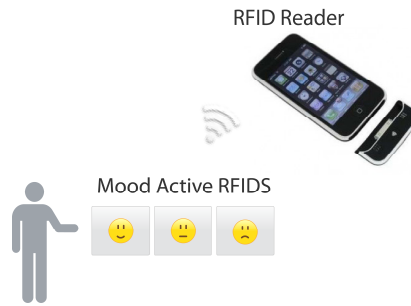


Figure 1. Student Interaction

The configuration after installation in the classroom is as follows: Installation of the software on the mobile device, introduction of the codes of each Active RFID tags and assignment of each code to its corresponding mood. In this way the central system is independent of any sub-systems to be installed in the classrooms, and by this, the system only needs to know the three mood identifiers.

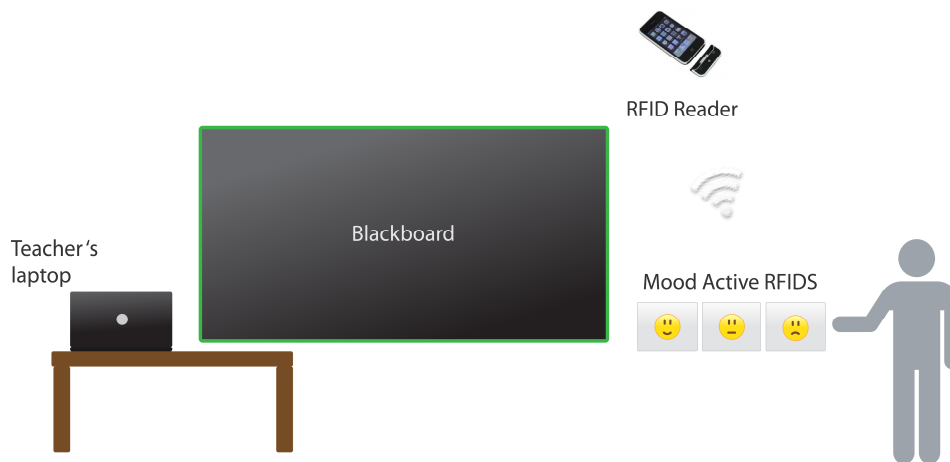


Figure 2. Classroom Distribution

The application on the mobile device is connected to the central system and passes the data via web service. There will be a device per class and the information of the classroom is introduced in it, in Figure 2. there are an example of the distribution. Each student must be registered to make use of the device and select a mood slide, so that the system can have a complete feedback from and for each student, and the way in which he or she has developed during the academic year.

4. The platform functionality and architecture

This section presents our platform, which serves to improve the education system based on the students' mood. It especially improves the weak points which will be associated with the negative mood of students in the classroom. The system features three states of mood: positive, neutral and negative. The central part of the system is a server where all data is stored, this server can be in the same place where the system is implemented or can be in another physical location and the access is done via the Internet. This server will contain all the information gathered by the system and its web interface as is shown at figure 3.

In this first version, it is not necessary to store personal data of students, because their votes are anonymous (as surveys are usually performed from the departments of quality of schools).

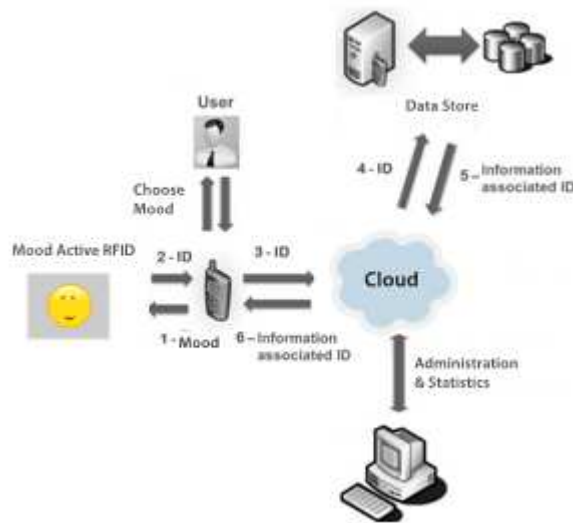


Figure 3. System Architecture

There are three types of users in the system, administrators, teachers and participants (students):

- Directors are responsible for placing the measurement systems mood of the students in the respective classes (system described above), these systems send the information to a central server in charge of managing this information.
- Teachers have a user in the system and they can check the data generated around their classes. The administration staffs of the high school are users with special permissions and have access to all data generated by the system. In addition, each teacher will be added to each of their teaching hours (lessons), so that he can insert comments in the system about the type of the given lessons: theoretical, exercises, examination and so on, are shown in Figure 4. Checking the type of taught lessons will help to better understand and interpret the mood of the students. When teachers start their lessons, they must check that the system is working correctly (active). This checking process is carried out via the web interface that is accessed by the teacher with user/password credentials. Teachers can set the type of lesson that they are giving and comment about it (at the beginning and at the end), if it deems necessary.
- Participants will use the mood measurement systems when entering and leaving the classroom, or in case they will continue in the same classroom, they must do this process at the beginning and end of each lesson with a particular teacher.

Moods

Back
Your Classes
Teacher: teacherName1

Math - 2nd grade

Ready to start a new lesson?

Waiting for lesson to start ...

Figure 4. Teacher Interface

There is an information collection system for each classroom, as described in the previous section of the article. The classroom is one of the main parts of the system, and we can say that the mood of each student is the basic unit of it.

4.1. Processing the collected information

The administration web application is used to consult the results and to insert the initial information in the system. Also, teachers can view the evolution of students' mood depending on the time line (daily, weekly, monthly and annual).

It is not up to students or teacher to say whether the use of this tool must be applied throughout the year or only during certain times, but after its use in different settings and with different time formulas, the obtained results could give us an idea of how to take advantage of this platform. The advantage of having sub-systems in each class that measure the students' mood and having a central server that recollect the information of all these sub-systems allow us to expand this system in more and more classrooms to cover the whole education system, in its different types and categories.

5. Case study

We have performed trials in a secondary school in the region of Castile-La Mancha in Spain. During two months of 2.011, one volunteer teacher introduced this methodology in the lessons; the teacher had two different courses 3° E.S.O. and 4° E.S.O., a total of 64 students. The teacher would start and finish the lesson at the web application from a PC, while students were using the panel with the active RFIDs tags to express their mood at the beginning and the end of the lesson.

We discovered that students not always express their true mood and sometimes are biased by their own classmates voting. The reason why this might be happening is that the RFID voting is not really anonymous to other classmates, since students can see which RFID sensor their classmate is choosing.

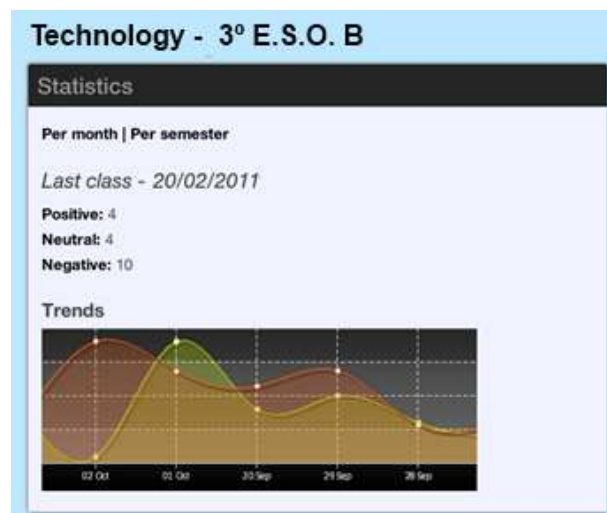


Figure 5. Class Results Interface

Nevertheless, the teacher found the recollected data useful since it is an indicator of how the teaching process is developing and an interesting indicator of how the students feels with respect to the teacher and the subject. There is an example in figure 5 of the data of one lesson with a 3° E.S.O. group during technology.

6. Conclusions and future work

The presented platform gives an idea of how to take in consideration the students feeling and opinion for a specific given lesson or subject. From one side, to make these students be part of the system in deciding the way they would like to be taught, and from the other side, to make their vote and expressions reach the responsible of the system to understand their needs. This will help the pedagogical department to improve the teaching lessons, content, and make the teacher feel more responsible in preparing his lessons (teaching way, and lessons content).

As future work, this first version will be improved to take into account several new points in education, like: trying to enter new data that allow the pedagogical department to more accurately know the reasons of students' moods. For example, if students have been punished for their behaviour during the session, or to get information of the students who have not develop their homework.

It would be interesting to add to the system, for each individual panel of students, new attributes in which they could ask questions without, as suggestions to the teacher or the pedagogic department of how they would like to improve some aspects of the lesson. Add different sub-systems for measuring moods, by changing the used type of RFID tags, from Active RFID to Passive RFID, so that each student can perform his opinion using his own mobile device (almost all new mobile devices have RFID reader) to have more privacy while voting.

Acknowledgements

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