Registration Management System for the First Access to a Public Moroccan Institution: Case Sultan Moulay Slimane University, Beni Mellal

Khalid Ghoulam, Belaid Bouikhalene, Zakaria Harmouch, Hicham Mouncif

Abstract—One of the essential topics in the information systems is the registration management. The objective of this project is to create a web portal designed to help new students on the first access to the Sultan Moulay Slimane University SMSU (Practical Information, Pre-Registration, Placement Test, Terms of use ... etc.) while creating a secure space protecting both data from the institutions of the University and student information. This portal is accessible from any computer connected to the Internet inside and outside the campus. In this work, we present a platform on the first access to the SMSU which is essential for authentication in the digital work space of the university. This platform allows university to make better decisions for students clustering, to avoid traditional manual method, and to reduce the cost in human and material resources.

Keywords—Registration, SMSU, Security, FAUSMS, digital work space, Placement test.

I. INTRODUCTION

THE SMSU is a young university [1], its information system is growing day by day as needed, and managing the pre-registration online is part of this system. Unfortunately, the old registration methods have several disadvantages: the paper waste, cost in human and material resources, more waiting time for registration, inefficiency and dissatisfaction of new students, hence the need to automate the process of access to the SMSU.

Nowadays, technology brings new strategies of learning and teaching, so it becomes a challenge to integrate the Information and Communication Technologies ICT into the program of higher education [2].

We developed the First Access to the University of Sultan Moulay Slimane FAUSMS platform; it provides users the following features:

- Online preregistration;
- Placement test;
- Admin space;
- Authentication and authorization management;
- Registration and placement test Statistics;

FAUSMS is a secure web portal which allows new students to register, according to the terms of access to the SMSU institutions. This platform developed and tested in 2013, and it manages preregistrations in the SMSU until today.

The paper has four parts, in the first chapter, a general study

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about the access to SMSU, the second chapter gives a global view of the analysis of the platform, the third chapter discusses security Platform, and the fourth chapter presents results and discussions, finally the conclusion.

II. FIRST ACCESS TO THE SMSU

A. Classic Method of Access to the SMSU

The old registration method to the SMSU institutions is done according to the following rules:

- Each student must complete a pre-registration manuscript form (Fig. 1)
- The student's services staff filled the information in the faculty database based on each student's manuscript form.

Fig. 1 Pre-registration manuscript form

As a result, the classic method of registration requires efforts in human and material resources, high time of input operations, more errors on student information; therefore, the information are obtained incorrect in student cards, registration certificates, hence the need to develop an application to solve these problems.

B. First Access to the SMSU Platform

SMSU is a young university, which puts it in its goals the use of ICT in managing education [3]. To facilitate initial

access to the university institutions for new graduates, it provides them with a set of digital services named "First Access to the University of Sultan Moulay Slimane" FAUSMS.

The architecture and the main actors of the FAUSMS are defined in Fig. 2.

Fig. 2 Architecture of the FAUSMS Platform

The general progress of the access to the university faculties:

- Reception the list of graduates by the end of May (Structured Query Language SQL SQL format);
- Installing the database on the central server;
- Opening of pre-registration by the FAUSMS Platform admin (early June);
- Filling the information by the student, and establish a student account via internet;
- Downloading the list of students by the admin;

In the next section, we present the FAUSMS project analysis and Unified Modeling Language UML [4] modeling.

III. ANALYSIS AND UML MODELING OF THE FAUSMS

This section discusses the analysis and modeling of the new system. Firstly, we present the inputs of the platform, modeling of the system database then the platform security phase.

A. The Platform Inputs

A web application is necessarily needs multiple data sources; the FAUSMS platform is based on the list of graduates and the database of questions and answers for the Placement Test.

By the end of May for each year, the ministry of Moroccan education sends a file (SQL format) to all Moroccan universities; the file contains a list of candidates' students for the current year as shown in Fig. 3.

Fig. 3 Example extracts from the SQL file

Among the services offered by this platform is the Placement Test, it consists of 3 levels test, it is necessarily to install a database of questions and answers, the questions are categorized into 2 categories: Structure/lexicon and understanding. Each question has four answers (Multiple Choice Questions MCQ).

B. UML Modeling of the Platform

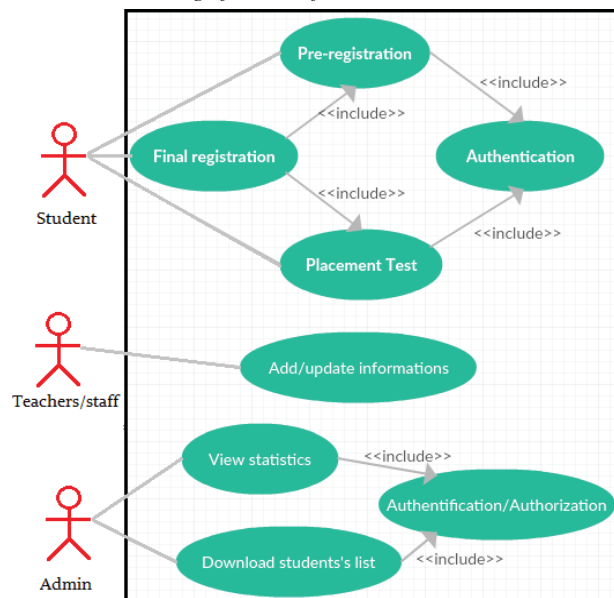Fig. 4 Use cases diagram of our system of the FAUSMS

The use case diagrams are a simple way to express the need of an information system, they collect, analyze and organize the needs, and identify the major features of a system. It is therefore the first UML step to analysis a system. In our use case, our system contains the following use case diagram actors: Student, admin, teacher and staff, each of these actors

is part of a set of use cases. Fig. 4 represents the use cases diagram of our system.

IV. The Security of the Platform

The platform is developed by the PHP Symfony2 [5] Framework based on MVC architecture, Symfony's security system is very powerful and flexible to work with. Symfony2 security is extensive, and we can control it very finely, but above all very easily. To achieve this goal, Symfony2 well separated two different mechanisms:

- Authentication: Authentication is the process that will define who you are as a visitor.
- Authorization: Authorization is the process that will determine if you have the right to access the requested resource (page).
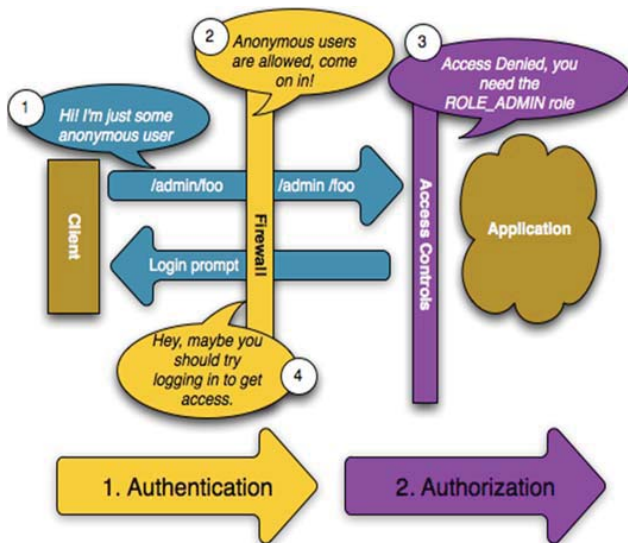

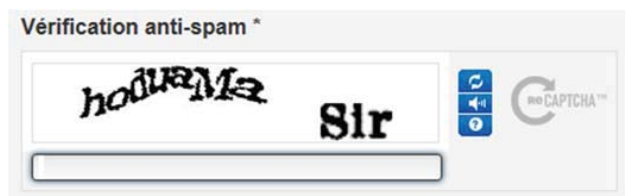Fig. 5 Symfony2 security mechanisms [6]

Fig. 6 Example of CAPTCHA Test

As we see in Fig. 5, the authentication mechanism is when a visitor sends a request to URL protected by the firewall, the firewall determines if the user needs to be authenticated or not. The authorization is when a user can access to an admin URL only if it has the role: ROLE_ADMIN. Moreover, we use the CAPTCHA [6] "Completely Automated Public Turing test to tell Computers and Humans Apart" test; it is a Turing test form for differentiating automated manner a human user of a computer. It is a challenge-response test used in the field of IT, aiming to ensure that a response is not generated by a computer. Fig. 6 shows an example of the CAPTCHA test used in the FAUSMS platform.

V. Results and Discussions

The platform manages access to all facilities of the SMSU during the last 3 years, we encountered several technical problems in the installation in the data central of the university, and these problems are solved thanks to the communication and sharing of ideas. In this section we present the statistics stored in the data center of the SMSU.

TABLE I
NUMBER OF PRE-REGISTERED STUDENTS

2013	2014	2015
7405	10456	14078

Table I allows us to conclude the changes since 2013 in online registration demand instead of the old pre-registration traditional method. The increase of the number of students is the result of the ease of use, the compatibility with all screen resolutions, the speed of loading web pages, and therefore proves the success of the platform.
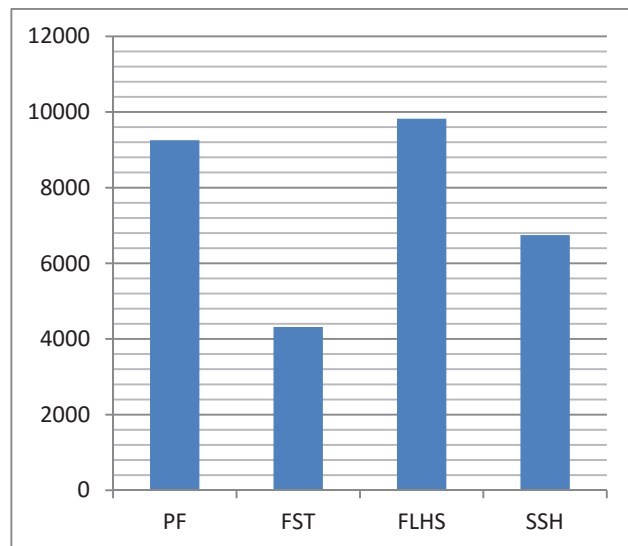

Fig. 7 Number of pre-registered students inside the SMSU (between 2013 and 2015)

Fig. 7 shows that Polydisciplinary Faculty PF [7] and the Faculty of Letters and Human Sciences FLHS [8] have the number of registered students more than the other faculties because they are both open-access faculties unlike the Faculty of Sciences and Technologies FST [9] and the Superior School of Technology SSH [10] as they are access regulated.

Fig. 8 and Table II detail the results in Table I, the increase of the number of students for all the SMSU institutions, it allows us to conclude that students of all educational sectors adapt with the online pre-registration instead of the old traditional method.
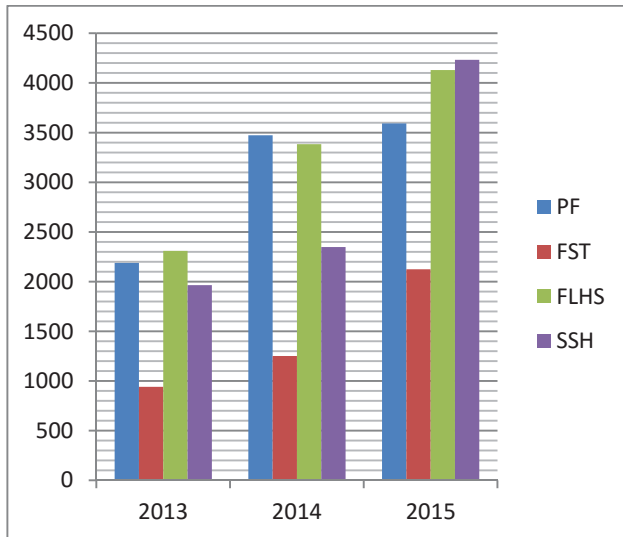
Fig. 8 Number of pre-registered students per faculty and per year

TABLE II
NUMBER OF PRE-REGISTERED STUDENTS PER FACULTY

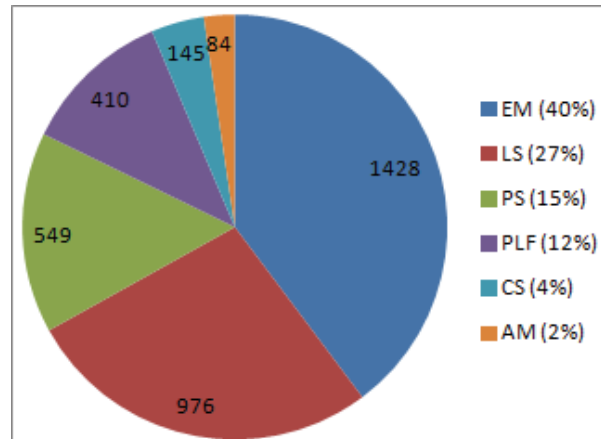|	PF	FST	FLHS	SSH
2013	2189	941	2310	1965
2014	3473	1252	3383	2348
2015	3592	2124	4130	4232

Fig. 9 Number of pre-registered students per "education sector" for the PF (from July 15, 2015 until September 02, 2015)

We present and discuss some statistics of the PF because of the diversity of educational Sectors (economics, low, math, physics, chemistry ...). Fig. 9 shows that Economics and Management EM occupy 40% of the total pre-registered; the second position is occupied by Life Sciences LS 27%, however Physics Sciences PS and Chemistry Sciences CS represent almost 19%, then the Private Law (French section) PLF by 12%, and in the last position Applied Mathematics AM 2%.
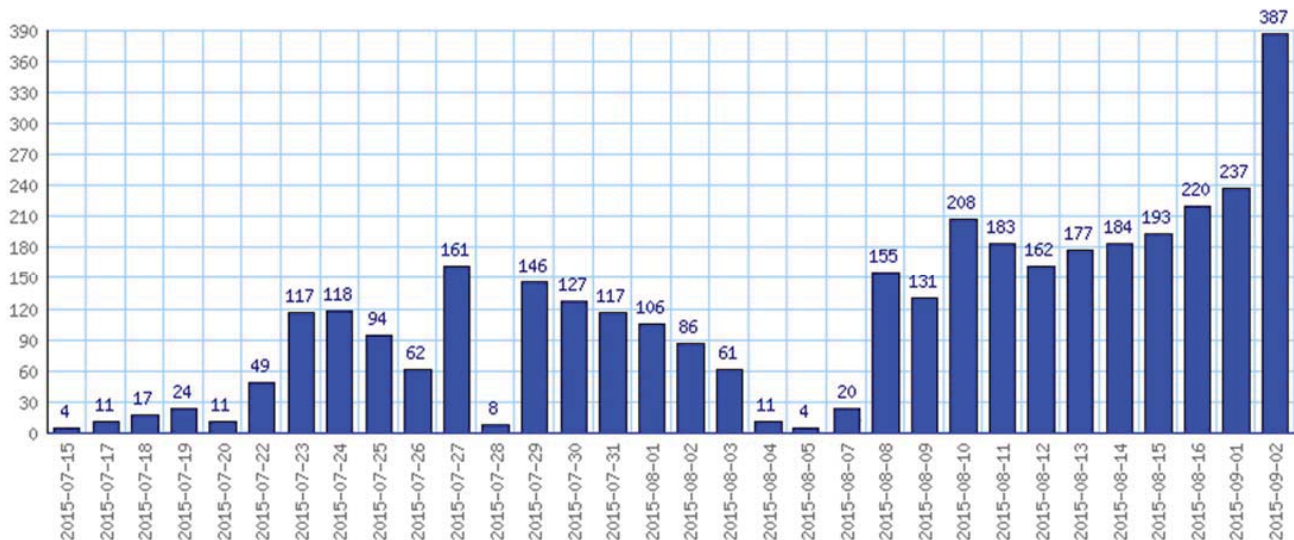

Fig. 10 Number of pre-registered students per day for the PF (from July 15, 2015 until September 02, 2015)

In Fig 10, we see the difference in the number of pre-registered per day, a minimum number of pre-registered the first days of launching the online pre-registration, we also note a very high number on the last day compared to other days, moreover a decrease of pre-registration between 4th and 7th August due to technical problems of the data center.
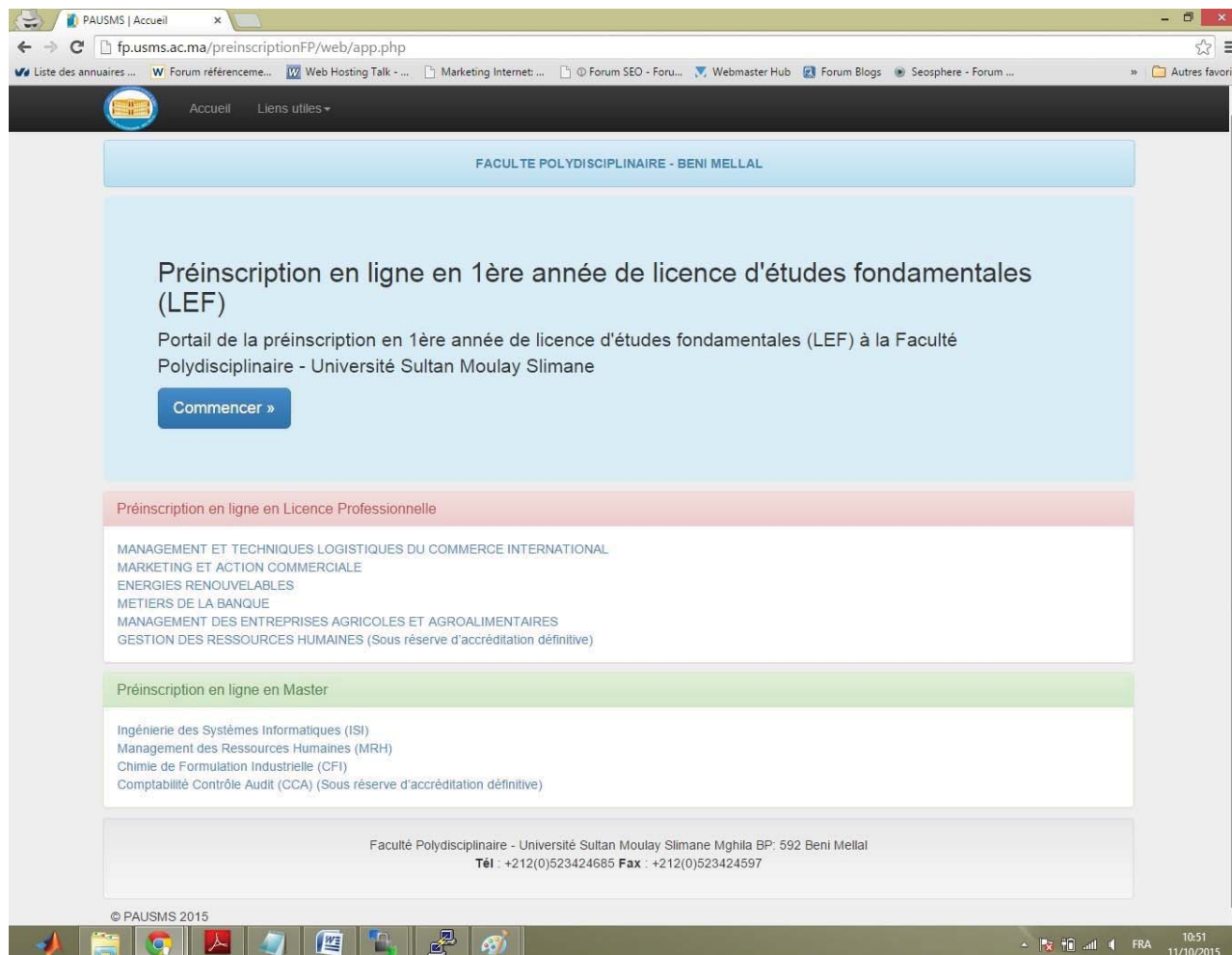
Fig. 11 FAUSMS Platform, Home page for the PF [11]

The platform as shown in Fig. 11 is now online at the official website of the Sultan Moulay Slimane University, the direct link is: http://www.usms.ac.ma/ there are also links to the FAUSMS in all of university institutions websites.

VI. CONCLUSION

In conclusion, the main objective of this work was reached. It was to create a platform which allows the new SMSU students easy access to the various institutions. Moreover, the FAUSMS platform reduces the cost of equipment used during registration (0 papers), and minimizes the effort for university institutions staff i.e. obtaining a list of Pre-registered with a single click, instead of a period between 7 and 11 minute for each new student entry.

Since 2014 we integrate online pre-registration for all levels (masters, engineer cycle…) and we develop the platform that it can be adaptable with all screen resolutions.

As prospects, we are working on developing and integrating the remote laboratories in the pre-registration platform.

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