A Tool to Reveal the Student's Work Activity Along an Academic Period

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Abstract— **This paper presents a web application designed to allow better workload distribution during a semester. The tool was designed to face the new goals that are required for teachers that work within new methods that are fostered by the Bologna Treaty implementation. The tool can help course administrators to improve the effect of some extra-initiatives (talks, workshops, tours, short courses, amongst others), without compromising the performance of students on their work scheduled for the course activities. The paper presents and discusses the motivation and the developed tool.**

Keywords-Internet; education; workload; pedagogy; interaction

I. INTRODUCTION

Nowadays high education institutions, all over Europe, are getting the first results from the implementation of the Bologna Treaty guidelines. According to [1] this treaty's main goal is "… to create the European higher education area by making academic degree standards and quality assurance standards more comparable and compatible throughout Europe, in particular under the Lisbon Recognition Convention…"

After the treaty implementation, in several Universities, Polytechnics or High Schools, the results begin to emerge and are in some cases reasonable but on the other hand there are some unsatisfactory results. These results depend not only on the institutions where the treaty was implemented but also from the actor's (teachers, students, etc.) point of view. According to [2], one of the consequences of the Bologna treaty is that "Teacher-centered knowledge-based teaching, resulting from memorization, turns into more democratic and balanced model where the student and teacher are closer and where personal contact is more prolonged and with more benefit for both. In this new model the student is responsible at a different level his/her work being more independent, autonomous and creative.". This means that the student's learning process is more based on the work and research they do, in an active way, than on the passive listening to what teachers say. A consequence is that teachers propose several works that must be done by students in the scope of the classes/subjects that they are registered on. This can lead to an excessive workload during certain phases of the semester or academic year.

It isn't our purpose to analyze the Bologna treaty implementation in this article. Our goal is to present an application that was designed to help the supervision of students' workload and to help teachers to have an idea about the amount of work of their students, having also in consideration the other teachers work proposals to those same students. This necessity was detected throughout the students' feedback that complained about the excessive workload required by the teachers during the semester. As consequence of this excessive workload we have notice an increasing class absence of students in the last weeks of the semesters because the deadlines to finish and deliver their works are generally in this period of time. If students have subjects from previous academic years, due to failure in past year(s), this scenario becomes even worst. To try to smooth the student's workload and give a different perspective to the involved teachers, a web application was designed and it is the main contribution of this paper.
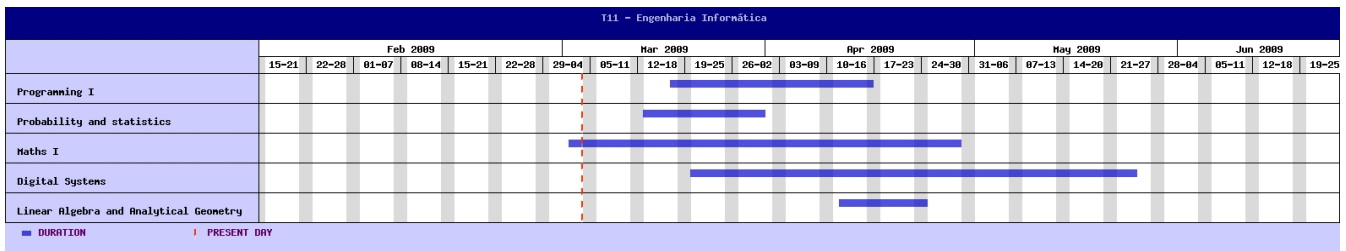
II. THE TARGET SCENARIO

Figure 1. Gantt chart (Student's view)

In our department, Computer Engineering department of a Technological Engineering School in Portugal, before the adjustments to the Bologna Treaty guidelines, we had several courses with a ten semester's curriculum to achieve the degree of Licentiate. The five years required to graduate was at that time accepted by the national Engineers Professional Organization [3] (OE) as the minimum requisite to be its member; in other words the time needed to be allowed to develop a professional engineering activity. On the other hand, students could finish the course in the end of the 6th semester and obtain the Bachelor degree. They could then begin to work, but with only these three years formation they could not apply to bean OE member. Nevertheless they could be recognized professionals by another institution, the Technical Engineers organization [4]. After taking their degree, students can continue their studies, masters or PhD, in other education systems, mainly universities in the specific case of the PhD.

Nowadays, in the Bologna era, courses passed from 5 years to 3 or 4 years duration, and the bachelor degree has disappeared. Post-Graduations and Masters became a 1 or 2 years complement and the PhDs became a 3 years program.

In this new scenario, after the course adaptation to the Bologna Treaty format, and based on our experience dealing with the students of our degrees (courses with 3 years duration), we have notice that students, complain about the excessive workload in the last half of the Semester. On the other side teachers don't have any information concerning the workload requirements by all the other subjects on a certain academic semester of a particular course. This "blind" reality, even to those institutions that possess e-learning platforms, fosters to situations that leads to an excessive workload. This can affect the students' performance/success. To give visibility to the work demanded by the several subjects of a given course, and to provide a clear overview of the work required from students, we propose a web tool that will be explained in the next section of the article. This beta version will be available in the next academic year and we expect to improve the work planning process from the point of view of students and teachers.

To resume, as previously referred, teachers suggest work proposals without knowing the others subjects' schedules/workload, and no previous knowledge about other activities (exams, workshops, study trips, etc). This led to students complains about an excessive workload in specific periods of the semester and inefficient work distribution during the semester. This motivates the design of an application to make visible the demanded student's work for all actors (teachers, students and course coordinators), to make easy to share information about the proposed works deadlines, to allow a global view about the course activity deadlines, and to allow all actors to contribute and interact with it. The tool presented in this paper was designed to allow these requirements. It is a web application that is described in the next section of the paper. This tool was already described on [5], and in this paper we add some new features that were adjusted/included after feedback from users that used a preliminary release of the tool.

III. THE TOOL

To implement the proposed tool, a web application was developed to enable all the management and view of the expected workload for a class/subject/course. The actors are the students (targets of the work proposals) and teachers (acting as general chair and the others acting as work proponents). The system was developed as a PHP [6] application with a MySQL [7] database engine. The back-office and front-office parts allow the management of all the interactions between the actors (registration and user hierarchy) and also the user-system interface respectively. In our opinion the interesting contribution of this paper is not the software application – because it is common to others already available - but the target application in terms of pedagogical issues and goals.

In the case of the proposed tool, some of the actions allowed for each actor are:

Administrator: validate teacher's registration; define the subjects for each course; consult any information in the system;

Students: See the time schedule and time duration of the proposed works and estimate the expected workload for a
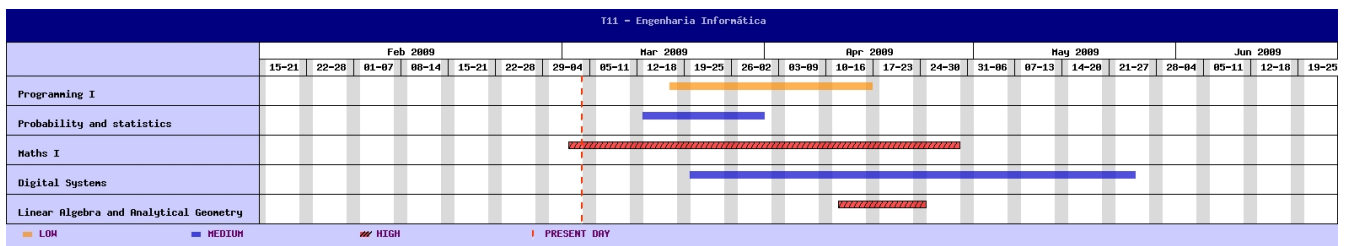

Figure 2. Gantt chart (Teacher's view)

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semester/course.

Teachers: Insert/change/delete a work proposal (time duration and difficulty). See all the already proposed works for certain class; visualize the global workload of their students.

Fig. 1 shows a screenshot of the application from the students and the visitors' point of view. Here we can find information about each subject of the semester. In our case, during a semester for a certain academic year (3 years to obtain licentiate degree), there are a large number of classes (usually a class has approximately 25 students enrolled in it). In Fig. 1 is presented the case of the class possessing the ID T11 (1st year, 1st class) for the "Computer Engineering" (in English) / Engenharia Informática (in Portuguese)" course. Using this view, the visitor can easily observe the Gantt chart of scheduled works. Teachers also have a similar view of the already proposed works, by other colleagues, thus having an idea about the required effort, because the work difficulty estimated by the other proponent teachers can be observed and distinguished by different colors (Orange - Low difficulty, blue - medium difficulty, Red - high difficulty), Fig. 2. By consulting this view, teachers can analyze the scenario before launching their work proposals/plans.

Students are not allowed to see the color code, because after feedback from colleagues, we conclude that this is not intended to limit the work's difficulty or to be used by students as excuses. The goal is to alert and help to improve their schedule and not to limit the teacher's goals for their subjects. The teacher will always have the last word, but knowing the global scenario that is being impose to his students, in a non-blind scenario. Fig.3 presents the GUI for students to choose classes. After that, they can consult the Gantt chart for the selected class, interface will be then similar to Fig. 1.

Teachers are validated by the systems' administrator. They are allocated to subjects of certain course. A teacher can only edit the time schedule for his subjects. But when editing the workload for his subject he/she views the scenario expected for the student's semester, in other words, all the works already scheduled for a particular academic year and semester. The teacher's view using the GUI to insert/edit a work for his subject is showed in Fig. 4.

As we can observe in Fig. 4, the teacher in the left can see and choose to edit the settings for the subjects allocated to him by the supervisor. In this example the teacher Jose Metrolho has two subjects for this semester which are: "Software Development" and "Computer Architecture". For each of these subjects it will appear in the right area the global scenario according the course curricula. For example, in case of "Computer Architecture" it will appear in the right area the already scheduled works for other subjects of the same course and semester. This means that before editing/inserting a work proposal, the teacher has a perception of the already demanded effort to those students. This is the goal of the application.

To insert a new work a form must be filled, as can be observed in the right down area of Fig. 4 (Title, beginning and deliver date, difficulty level, if it is a written exam (in this case will be set only the start date) and optional about that work details that will be available for all visitors).
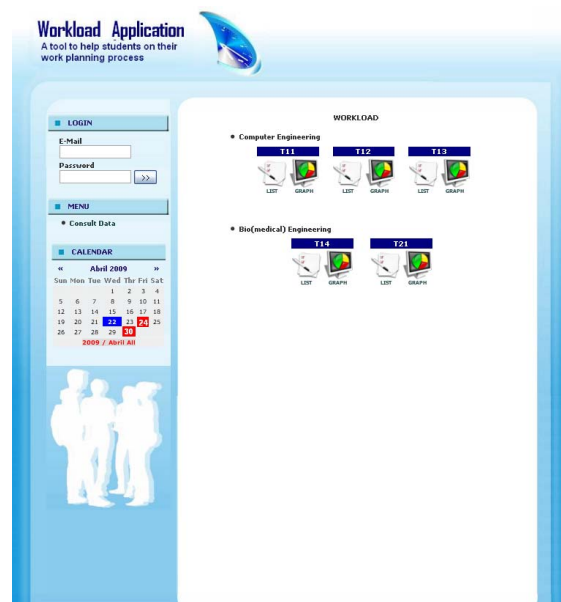

Figure 3. Graphical User Interfacefor students to choose the their classes (minimum of one) within certain course. Each class has several subjects. Each subject as a Time Gantt chart similar to the one showed in Fig.1.
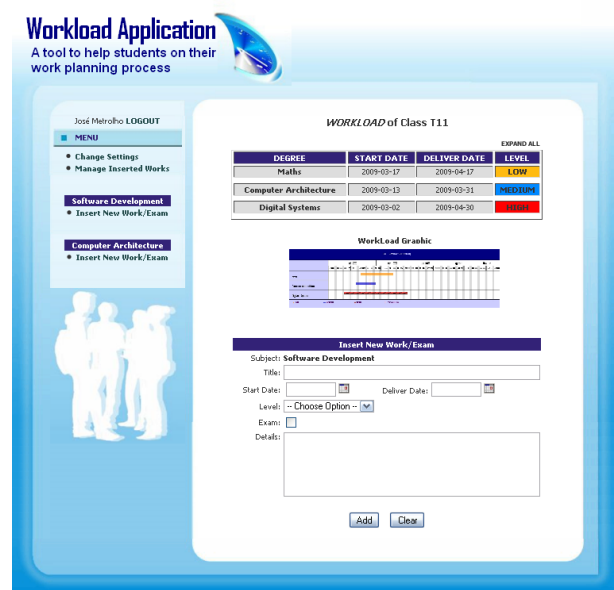

Figure 4. Graphical User Interface to propose a work by a teacher

The administrator is responsible to define the set of subjects for a certain course, insert all the courses and corresponding curricular plans. Fig. 5 shows a screenshot from the subject vs. course correspondence. A subject can be common to one or more courses. He is the one also that inserts the teacher's name and the corresponding email address, Fig. 6. The password is automatically generated for each registered teacher and the system sends it by email. The teacher-subject correspondence is also set by the administrator at the beginning of the academic year.
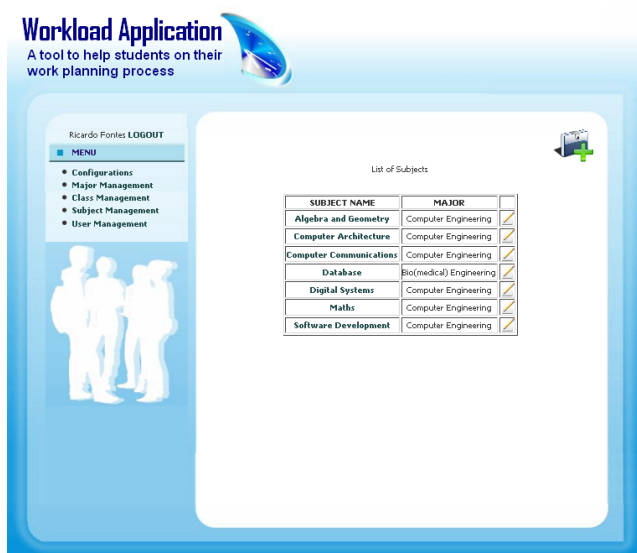
Figure 5. Graphical User Interfaces of the Administrator's back-office to define subjects of a cource
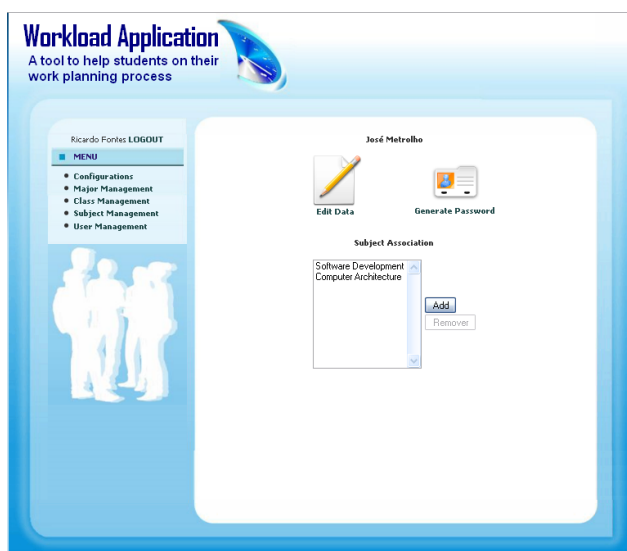

Figure 6. Graphical User Interfaces of the Administrator's back-office to edit data about a teacher's profile

IV. CONCLUSIONS

This paper introduces a web tool to allow better assessment and workload distribution along a Semester. The tool was designed to face the new goals that are present for teachers that work with new methods that are fostered by the Bologna Treaty implementation. This is the case of computing, programming, communications or embedded systems, amongst other courses.

In our opinion, this tool can also help course administrators to improve the effect of other initiatives (talks, workshops, tours, short courses, among others), without compromising the performance of student on their scheduled work for other course subjects. This view of the time table can lead to a better organization of extra activities in periods that do not compromise the students work production.

Another feature is to improve the students' organization skills.

The contribution is to improve the student's performance and not to impose limits to the number and difficulty level of their workload. The number and difficulty are responsibilities of the involved teachers, so the system doesn't have means to impose limits. The system just gives to the users an overall view about all the demanded workload, this information can then be used to achieve better results by smoothing the student's workload as possible, through a correct work planning.

The tool will be used in the next semester and the expected results are: improve the course(s) coordination; improve the work balance; improve indirectly the work's quality; improve the student's success rates, improve the student's grades and improve the impact of extra activities. In terms of software application we pretend to improve the application based on user's feedback, make available the application to be used by colleagues of other Institutions, and improve the design of the GUI. Actually we are implementing, as ongoing work, and advisor module (alert about the deadline approach by email for the registered students and teachers).

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