The teaching involvement of the users, the units and the whole UPC measured through the Moodle indicators of the virtual platform Atenea. An extension proposal of Atenea's BI platform

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ABSTRACT

Atenea is the Moodle virtual platform of the Universitat Politècnica de Catalunya (UPC) with about 31000 users and 5000 active subjects from 16 school centers. Atenea indicators give information on the teaching activity of the users and centers. This is specially relevant when teaching is online, as was the case in the Covid-19 period. The UPC already has a Atenea's Bussines Intelligent platform (BI), which has recently been launched. In this 1st phase the Institute of Science of Education (ICE) has actively participated in the design of the application. Currently it shows basic indicators over a period of time where one can filter or compare by centers or type of users. The paper presents this design and make a proposal for the extension of the BI, for the future, with respect to: 1) the inclusion of some key indicators for measuring the subjects' activity, 2) a proposal for cross-referencing data with academic performance.

1 INTRODUCTION

1.1 Teaching at the UPC

The teaching and learning development at the Universitat Politècnica de Catalunya (UPC) take place phase to phase at the schools, in classrooms or laboratories. Like most universities, the UPC also has a virtual learning environment to facilitate access to content, resources, documentation and to deliver digital tasks. The UPC has a unique Moodle virtual platform, named Atenea, which manages about 5000 courses and has 31000 registered users in the various school centres and Faculties (total 16), about 3000 are teachers. The regulation of training, learning opportunities, educational technology adoption, updating, and recycling of the knowledge of lecturers is managed by the Institut de Ciències de l'Educació de la UPC (ICE-UPC) [1].

1.2 Backgroun of Moodle indicators at the UPC

ICE is also responsible for training lecturers and managers in the use of learning management systems that are based on Moodle. In July 2019, ICE-UPC began the extraction and initial analysis of Atenea indicators. These practices and tests during over a period of two years gave us an insight into how to gain the maximum benefit from these indicators. Atenea's corporate business intelligence indicators (BI) for the UPC are currently being designed with advice from ICE, and right now a first limited version is already accessible for all the community [2,3].

During the period Covid-19 (from March to June 2020), lecturers were trained by ICE with online teaching and the use of Moodle tools, so the Ateneas platform use was extensive [4,5]. That background with the use of virtual techniques will surely enrich the traditional teaching, where a continuated evaluation across virtual platform will arise. For this reason it is important to study the virtual indicators that provide important information regarding the type of teaching activity—such as online

continuated evaluation, the level of teaching activity for a given subject (even including assignments that were completed per user in a subject).

2 METHODOLOGY

2.1 Global key indicators

Atenea's BI, right now is designed that gives a global UPC useful information during a fixed period of time[2,3]. The indicators viewed are classified in:

1) Sessions/Users: Logged in sessions, logged in users, active users.
2) Activities/resources: Created (by teachers), Read (by students).
3) Qualifications: Input of grades and visits to rating grid

Graphs of the evolution of time are displayed where the unit of time can be chosen (hour / day / week / month). In addition, it can be filtered and compared over time by groups (Teachers (PDI) / administratives or estudents), units (school centers or departments), degrees (Degrees or Masters) and in some cases, by type of activities or resources. Finally, the relative weight of the indicator by groups, units and degrees throughout the period can be compared in bar charts. See examples in Fig. 1.

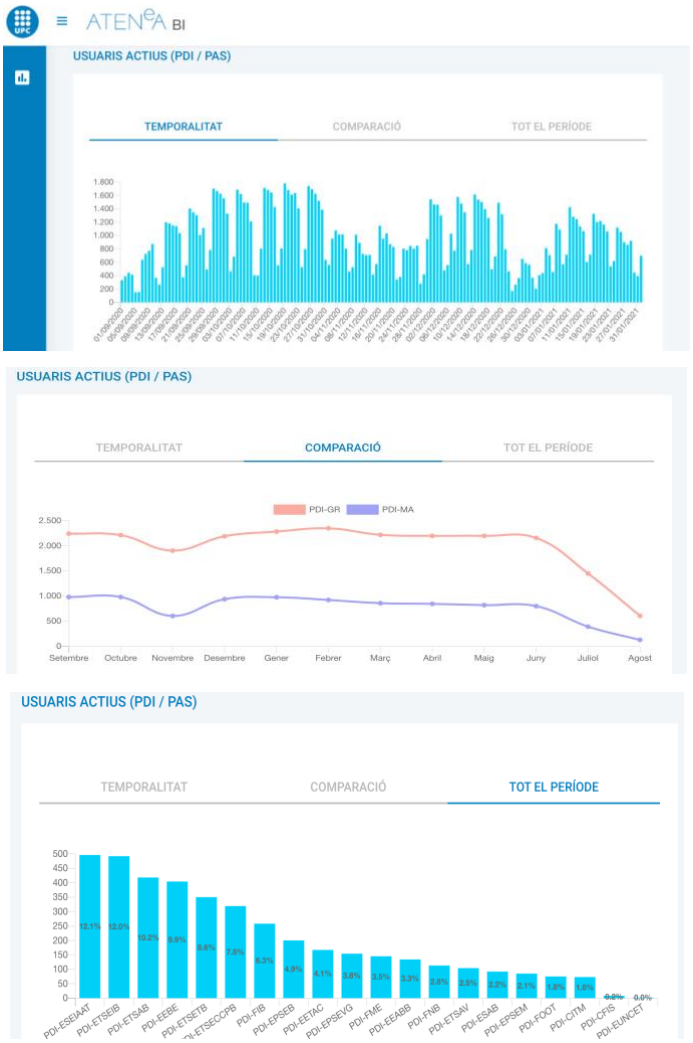


Figure 1. The Atenea's BI platform. Different displays during the academic year 2020-21.

2.2 Key indicators for measuring the online teaching activity

One useful teaching key indicator is the *Level of activity* of a subject during a term [2]. The subjects are classified according to the level of activity: low, medium, hight. We defined the level of activity depending on the number of actions by user in mean value. The reference values were taken from a 'normal' period of teaching (before covid-19 pandemics, for instance). The division was done, so that 66% of the subjects are medium activity and the rest are equally divided between high and low activity levels (see Fig. 2 like the application to a real example).

This is a good indicator to measure activity within a subject but to properly characterize the use of Moodle resources should be added:

- an indicator of *Intensity of use* for each resource / activity duly standardized similar to how it is done with the level of activity, and

- an indicator of the *Variety of use* of resources / activities used that simply counts the different number of resources/activities used.

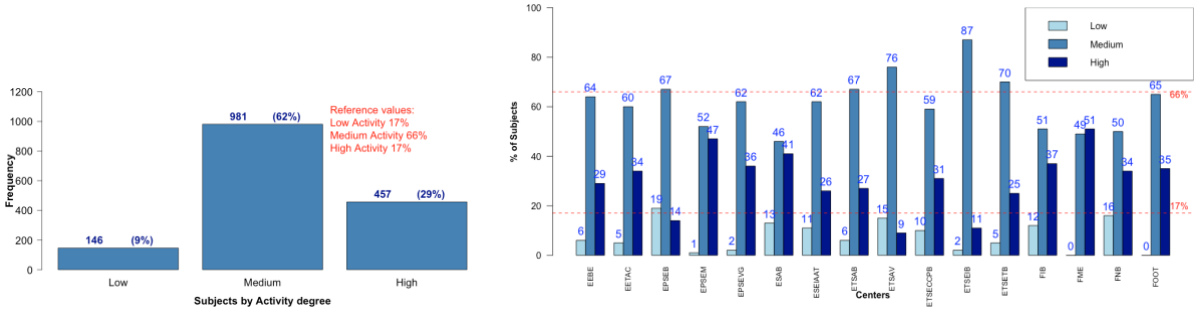


Figure 2. Left: Number (and %) of UPC's subjects during Q2-2020 term classified according to the level of activity and the reference values before Covid-19. Right: Comparison of the level of activity between UPC School Centres.

3 RESULTS

3.1 Proposal of extension of Atenea BI

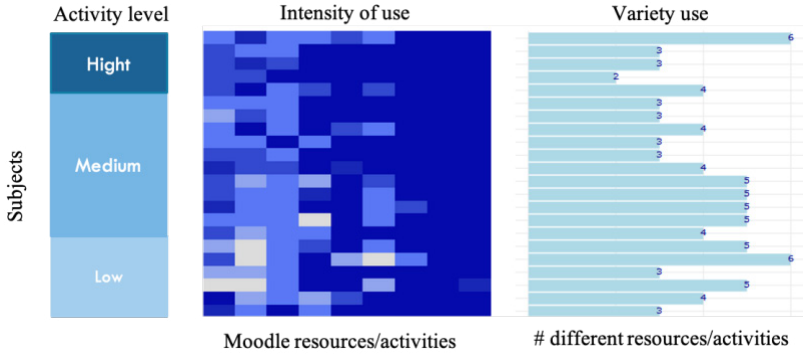
Thinking in terms of measuring and compare the subjects activity in a period of time seems natural to perform a heat map of the activity of all the subjects. A proposal of this is to use the 3 indicators in section 2.2 : *Activity level, Intensity of use* and the *Variety of use*.

A display proposal of a **heat map Atenea's activity of a center** is shown in Fig. 3, where the subjects activity of a unit is measured during a semester: each row is a different subject and in each column are ploted the three indicators. In this case the subjects are ordered with respect to the *Activity level* of subjects (see left row). The central colum of *Intensity of use* is ploted like a matrix where rows are the subjects and columns correspond to each type of Moodle resources/activities (files, tasks, quizzes,…), in addition the color of cell, gradated from white to blue, depends on the intensity of use, for instance measured from 0 to 5. The Variety of use is plotted directly like the frequency of different resources used.

An extension of this idea can be applied to see the **heat map of activity of the UPC centres,** changing subjects by school centres.

The heat map would be useful to cross-referencing data with academic performance, for instance with the percentage of non presented students. Is the engagement of students bigger when the indicators of activity of a subject are big?

Figure 3. Proposal of heat map of activity of a unit during a semester. Every row is a unit's subject



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