"PERFIL CURRICULAR" - A DIFFERENT ACADEMIC YEAR IN PORTUGAL

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Abstract

In Portugal, Faculties of Science and Technology with degrees in Engineering and Sciences must address an important problem: the number of students failing their modules. In Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa (FCT NOVA) and specially in the areas of Mathematics and Physics this failure was higher than desired. On the other hand, the faculty wanted to introduce mandatory modules aimed to provide the students a range of "transferable skills", organised as "true modules" and not "curiosities".

The academic year in Portugal is usually organised in two "semesters": 14 weeks of classes + 9 and 6 weeks of exams per semester with 2 different exams per module. In 2012-13, FCT NOVA changed this organization of the academic year. The 2 semesters and the 14 weeks of classes were kept. But from then on there is only one month of exams per semester and only one exam per module. Between the two semesters and for 5 weeks all FCT NOVA degrees, except PhD, have 4 different mandatory transferable skills modules, one per curricular year.

Since the evaluation period decreased with only one exam per subject, it was necessary to implement school wide, a system of Continuous Assessment, allowing the students to finish each semester and their modules without having to sit any exams – they can attend one exam per module if they fail or want a higher grade. FCT NOVA believed that such an Assessment system would dramatically improve the student success rates in every module. In fact, since the very 1st year of implementation of this new calendar and evaluation, students are performing much better. This paper demonstrates this by focusing on the continuous assessment results between 2010-11 and 2015-16 both for the whole school and for three departments, as general examples.

Keywords: FCT NOVA, Academic Curriculum, Academic Year; Soft Skills, Continuous Assessment.

1 INTRODUCTION

Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa (FCT NOVA) was created in November 1977. Currently, the school has 14 departments (Environmental Sciences and Engineering, Materials Science, Mechanical and Industrial Engineering, Physics, Computer Science, Mathematics, Chemistry, Earth Sciences, Life Sciences, Electrical Engineering, Civil Engineering, Social Sciences, Conservation and Restoration, and Science and Technology of Biomass), 16 research centres, 8 support services, 535 teachers and researchers – 212 Female, 323 Male - and 193 other staff – 151 F, 42 M. The faculty serves a community of over 8000 students of which about 1400 are graduate students (MSc and PhD). Students are distributed across a wide range of three-year degrees (Cellular and Molecular Biology, Biochemistry, Conservation-Restoration, Mathematics, Applied Chemistry, and Geological Engineering), five-year degrees ("Integrated Masters") (Environment, Biomedical, Civil, Electrical and Computer, Physics, Industrial Engineering and Management, Information Technology, Materials, Mechanical, and Micro and Nanotechnologies) and more MSc and PhD degrees with very heterogeneous cultures, preferences and needs. As a result, significant differences can be found in motivation, communication skills, working habits, and interpersonal skills, strongly affecting students’ academic performance.

To mitigate these asymmetries between students, help them achieve better academic results and also better prepare them for the labour market, a general restructuring of the FCT NOVA degrees was performed in the 2012–13 academic year, with a view to providing our students with an important set of "transferable skills". We also hoped this would help reduce the rates of failure in modules.

Competitiveness in the labour market is higher than ever before. Therefore, a professional engineer or scientist needs to be much more than just an expert in their area of expertise. FCT NOVA decided to innovate and create conditions for its students to receive a more varied and comprehensive training, without compromising the fundamental training in each degree. A full curricular restructuring was
implemented, leading to the creation of a new curricular profile. The first step of this reorganization was the homogenization of the number of ECTS (European Credit Transfer and Accumulation System) credits of all the modules in multiples of three ECTS credits.

This standardization allowed a more efficient and clear organization of the curricula of the different degrees offered. Also, to allow students to be trained in cross-cutting areas and to develop complementary skills in addition to the traditional training in science and engineering, it was necessary to find a way to introduce new modules in the different curricula (which traditionally have been very intensive, leaving students little free time). Since it was impossible to increase students’ workload during either of the two semesters, it was necessary to find an alternative solution for the academic year that would allow the new transferable skills modules to be inserted into all degrees in such a way that their importance was explicitly recognized. An analysis of the structure of the academic year prior to this restructuring (see Fig. 1) shows two semesters with a period reserved for exams at the end of each semester.

![Figure 1. Academic year before 2012-13.](image)

The considerable duration of the two examination periods (nine and six weeks, respectively) was due to the existence of two exam rounds, to ensure that all students had a minimum of two assessment opportunities for each module.

Since the timespan of the core classes could not be shortened, it was necessary to reduce the length of the exam periods. Thus, it was decided that all modules would adopt Continuous Evaluation during the semester, creating an opportunity to pass every module within the normal class period. This allowed us to remove the second round of exams and reduce the exam period to three weeks per semester.

![Figure 2. Academic year after 2012-13.](image)

Using this strategy, it was possible to free up five weeks – in red – between semesters and to leave the month of July free (see Fig. 2).

It was decided to use the new five-week period for teaching a set of mandatory transferable skills modules. In these modules, the students acquire diverse skills that enrich their studies and better prepare them for subsequent learning activities. The following modules for the inter-semester period were created:

**First year:** CTCT – Transferable Skills for Science and Technology consisting of CV preparation; Time management; Team work; Leadership; Advanced use of Excel;

**Second year:** Science Technology and Society - gives students an understanding of the contemporary technological–scientific world, motivating them to consider the impact of science and technology today.

**Third year:** Introduction to Scientific Research / Introduction to Professional Practice (final year for the students doing a three-year undergraduate degree) - gives students direct contact with companies or research teams through a five-week internship. Since 2012-13, 800-900 students per year have taken internships in many different enterprises.
Fourth year: Entrepreneurship training - stimulates students’ potential for the creation of value from an idea to the creation of a new business. In 2012–13, more than 500 ideas emerged and 160 business projects were presented and these have been the average numbers every year since.

In the fifth year, students are usually preparing their master’s dissertation, so this five week period is used for their dissertation work.

The school also used this change in curricula and calendar to introduce 6 ECTS in 180, + 6 in 120 or 12 in 300 ECTS of mandatory optional modules from completely different scientific areas from the ones each student is originally enrolled in (see Fig. 3). A specific “Erasmus-friendly semester” in each degree was created to facilitate student mobility.[1]

![Figure 3. Distribution of the free optional modules](image)

2 METHODOLOGY

During the preparation of the new 2012–13 Academic Year, the school went through different phases. The very first stage was to persuade the school – staff and students – of the value of this change. There was agreement that degrees should be rearranged to include the free choice ECTS, meaning that the syllabus of the modules with previously different ECTS had to be revised. But the idea of a Continuous Assessment system for every module was an impressive obstacle both for staff and students. The former did not like the idea of having the school interfering with their evaluation methods; the latter resisted when they understood they were going to lose one of the exams.

As mentioned, the Continuous Assessment was needed to provide the students with the same two opportunities of passing each module and thus minimise the effects of the loss of one of the exams. There was also a sense that the old schedule encouraged or enabled procrastination. There was “yet another exam” so they tended to study primarily or only for the last one. It was impossible to succeed if doing this for every module in the semester (5 – 7 modules overall), and thus many students just did not complete their evaluation at all. With a Continuous Assessment system during the semester, at least some of these students realised they should begin their studying much sooner.

The final step was to produce a set of Assessment Regulations (link in Portuguese) mandatory for the whole school. The regulations are somewhat loose. Mainly: i) at least three evaluation moments during the semester for each module. They could be quizzes, laboratory reports or any other characteristic that can be assessed; ii) a certain amount of evaluation had to be completed until a particular week of the semester; iii) Projects, Seminars and Dissertations are not included in these guidelines; iv) some experiences with different evaluation methods like Team-Based Learning are allowed; v) also, more specific rules were added to prevent quasi-legal discussions between students and staff on the interpretation of the regulations; vi) all these regulations do not apply to PhD degrees.

During the first semester of 2012-13, the first one with all these changes, the school was in trouble. The students could not cope either with their time management or with the workload, now daily; the
staff were complaining the students could not cope. The Assessment Regulations were revised for the second semester to clean up the main problems detected during the first semester and from them on only very minor improvements have been added. Since then everything came to order.

3 RESULTS

This section will present some of the results obtained with the Continuous Assessment. The data begins with the 2 years before 2012-13, indicated in pale blue.

3.1 FCT NOVA as a whole

The first five Figures show the faculty. Fig. 4 shows the overall rate of success of all the students in FCT NOVA, from 2010-11 until 2015-16 (the last year with complete data). Fig. 5 shows the average mark across pass marks for the faculty during the same period. A rise in 0.5 in the average mark of the faculty is quite good since it accounts for the marks of about 67,000 students' enrollments per year.

During the first year of implementation of the Continuous Assessment system, a discussion took place. The students were succeeding more; also, the average marks were better. The first result was somewhat easy to explain. Since a greater number of students were being assessed the pass rate was increasing. However, could the faculty be sure that the stronger students were doing better? What
about the percentage of the better marks overall? Fig. 6 answers the question. It shows the percentage of pass marks with a mark over 16 (within a marking system with marks from 0 to 20).

In fact, the percentage of students with marks higher than 16 has also risen (circa 7%). Normally, what happens is that the stronger students who are unhappy with the marks achieved in the Continuous Assessment period tend to sit the final exam to increase their marks.

But where was this new overall success concentrated? In a specific curricular year? In several? The last year of the 5-year degrees is not represented because it deals mainly with student dissertations.

Fig. 7 shows the increased success is well distributed across all the four curricular years, but is a little more pronounced in the first two, as one should expect. The younger students tend to benefit more from this type of evaluation since it better structures their study when arriving at the University.
3.2 A difficult department: Mathematics (DM)

In FCT NOVA modules in Mathematics and Physics generally have a high rate of failure. Thus, it is important to show what has been happening in the Mathematics Department (DM). DM has around 76 staff and is responsible for all the modules in this area, as well as a 1st cycle and a Master in Mathematics, representing 10,000 students’ enrollments per year.

![Figure 8. Pass Rate for all the DM modules](image)

Fig. 8 shows that the Pass Rate of the “old days” was bad. Even today, it is only fair, but just by changing the evaluation strategy it increased 20 points, a 50% increase, in 4 years.

![Figure 9. Average mark across pass marks for DM](image)
Fig. 9 shows the mark improvement in average pass marks – from 12.15 to 12.52. That number is not as good as one might want, but having more students succeed while still rising their average marks even if only by a little is a very good sign.

![Figure 10. Percentage of Pass Marks ≥ 16 - DM](image)

On the other hand, Fig. 10 shows a steady rise of the percentage of DM pass marks that are higher from, or equal to, 16. Not as big as the faculty number - 7% - but a fair value of almost 4%, nevertheless.

### 3.3 A normal department: Chemistry (DQ)

The DQ has 49 staff and is responsible for two 1st cycles (Applied Chemistry and Biochemistry), an Integrated Master in Engineering (Chemistry and Biochemistry) and several masters’ degrees. It is also responsible for the modules of General Chemistry and Biochemistry in several other degrees, representing 8,500 students’ enrolments per year. In this department the positive results of the Continuous Assessment were also noticeable, 69% to 87%, as Fig. 11 shows.

![Figure 11. Pass Rate for all the DQ modules](image)
Fig. 12 shows a very good increase in the average mark of DQ modules: almost 1 and rising.
Finally, Fig. 13 shows the percentage of pass marks ≥ 16 at DQ. Here, a big increase in this percentage (circa 12 percentage points) can be observed.
3.4 Civil Engineering department: trying to cope with the change (DEC)

The department has a staff of 26 and is responsible for an Integrated Master of Civil Engineering with 3,200 students’ enrolments per year. As seen in Fig. 14 the first year of change was not very good. During the following years, it recovered somehow but its pass rate gain is relatively small – 13. The average mark also gained very little – 0.2 overall – with a significant fall in 2013-14 right in the middle of the period of implementation of these changes, as Fig 15 shows.

Finally, the percentage of pass marks ≥ 16 shows erratic values completely different from any other degree in the faculty (see Fig. 16).
4 CONCLUSIONS

The faculty has now got used to this calendar. Considering the overall data shown for FCT NOVA, the Continuous Assessment is changing students’ results for the better becoming an important tool to lower their academic failure.

So, how is the school really coping with this change? An important number of staff still have reservations about Continuous Assessment. They do not dispute the results, but they say students do not have the time to sediment their knowledge since “they are always being evaluated and studying for the next test”. While they may have a point here, it should be stated that students’ evaluation workload is decided by the staff themselves. On the other hand, it is worth noting that before these changes, the students were studying mainly for the exams in conditions where they had seven weeks to study all modules, which meant they often memorised and dumped their answers only to forget them after the exam.

Some students that have to repeat a curricular year complain about having 5 weeks between semesters “without anything to do”, since they have already completed their five weeks’ module previously. To address this, the faculty offers everyone the possibility of enrolling in many other activities during this period, from foreign-language modules, to IT workshops or sport activities.

The faculty has yet to focus more closely on the departments that are doing less well. Maybe there are specific and local idiosyncrasies that the school has not yet been able to understand. Maybe some additional change is necessary in these departments.

Two natural things are happening. 1) As time goes by, this system becomes less questioned, because an increasing number of students do not know any different, as they have not been exposed to the old academic calendar or assessment rules, having first enrolled after the new system was put in place. Within two more years, at most, this will be the case for all students; 2) Also because of this, the growth in the results of Continuous Assessment will reach a plateau. It is not possible to maintain this increase in marks and success rates indefinitely. Even so, it is now the time to concentrate the efforts on the organization of the evaluation procedures for each module to try to better schedule their dates during the semesters and more effectively spread the students’ workload.

REFERENCES