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TOWARDS INTEGRATING MECHANISMS TO ASSESS STUDENTS' OFF-SITE WORK WITHIN THE REGULAR TEACHING-LEARNING PROCESS

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Abstract

The deployment of the Bologna process has caused a shift in the education paradigm of university studies. In this new education model, personal study is a crucial part of the learning process. However, in most cases, the personal (off-site) work performed by students is just evaluated by means of assignments, in the form of reports or deliverables. They could surely provide evidences of the degree of achievement of certain learning outcomes, but can hardly provide insights on how students have organised and coordinated (especially in a group work) to hand over the assignment, on the time devoted to perform the task, on the perception of the students about the usefulness of the task, etc. Accordingly, the "Tools and Strategies for Competences Assessment" (TASCA) "Innovation and Quality Education Team" (EICE) from the Universitat Politècnica de València (UPV) has focused its initial efforts on gathering and analysing different information related to the personal study/off-site work carried out by students. Preliminary results show that there is not a clear relationship between the time devoted to each task and the obtained results, but there exist a number of students that devote a large amount of time to the task and get poor marks. If this feedback is obtained early during the course, the teacher can tutor those students to determine their specific problems and propose corrective actions. Another important aspect in the student's learning process is that, in general, the ratio between the number of on-site work (lectures, seminars, and labs) hours and off-site work (personal study, assignments, etc.) hours must be well balanced. At UPV, for instance, this ratio should be of 1.5 off-site work hours per each on-site work hour. However, the lack of adequate supervision of off-site work leads to situations where such time is underestimated or overestimated. While overestimation leads to a waste of time, underestimation of off-site work leads to overload, which may burn-out the student. Supervision of student's off-site work is thus an essential asset for the adequate tune of courses. Coordination among different courses and departments could also be of prime importance to distribute exams and assignments along the course, avoiding workload peaks in specific periods of time. Finally, an estimation of the degree of usefulness and satisfaction from students' perspective may help teachers to improve the assignments of their courses to raise students' motivation. Hence, the integration of mechanisms within the regular teaching-learning process to measure and assess the off-site work performed by students, not just its quality, but also the time required to fulfil the task, and the perceive usefulness and satisfaction, among other parameters, may provide a very interesting feedback to stimulate reflective and analytic thinking about the work done, increase students' motivation, and improve the organisation and planning of course in general.

Keywords: off-site work, feedback, formative assessment

1 INTRODUCTION

Off-site work has acquired a greater relevance in the teaching-learning process after the Bologna process has acted as director plan for university studies. Accordingly, off-site work has consolidated as a fundamental strategy to train and develop students' specific competencies and carry out formative and continuous evaluation [1].

Under the general term of “student’s off-site work” there are hidden many techniques, for promoting and controlling different student’s activities, which are rarely addressed in publications and barely used in practice. As such, this off-site work is usually limited to deliver some reports for their subsequent evaluation. However, the rest of intangible parameters that cannot be captured within a deliverable are lost and are neither controlled nor evaluated. Being able to trace, among other aspects, how students organize and coordinate their work, or the different strategies they deploy, or the time they employ, for reaching their objectives, could be also very useful to enrich the evaluation process and improve the feedback finally provided to students [2].

Knowing the impact that such lack of information may have on students’ performance, it is surprising that there are so many difficulties in evaluating the actual off-site work carried out by each student. This not only a matter of tracing the time devoted to the various tasks proposed to students, but also a matter of obtaining enough concrete evidences backing up this work. Fig. 1 depicts some of aspects requiring further efforts to improve the monitoring the students’ off-site work in order to guarantee a fair evaluation of such work and the provision of a proper feedback to the student.

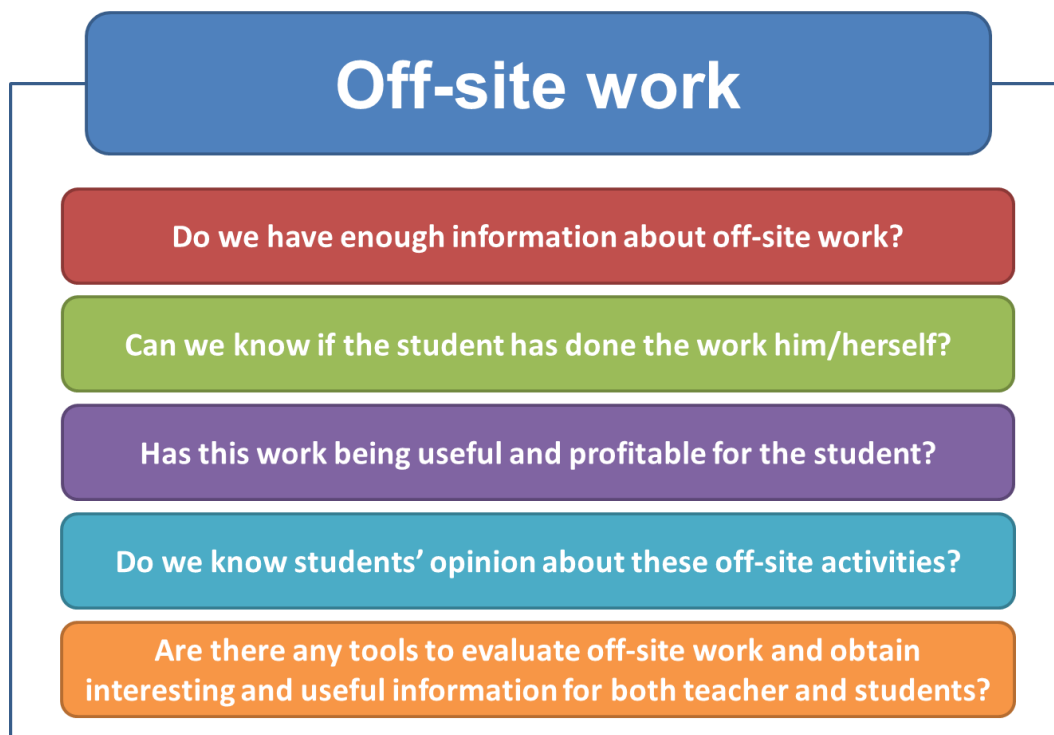


Fig. 1. Unsolved questions about students’s off-site work.

2 GOALS

The “Tools and Strategies for Competences Assessment” (TASCA) “Innovation and Quality Education Team” (EICE) from the Universitat Politècnica de València (UPV), through the “Supporting Formative Assessment Through the Strategies for Gathering Off-Site Work Information and Evidences” (A08/13) “Project of Education Innovation and Improvement” (PIME), aims at analysing, applying, and assessing formative and continuous methodologies and strategies to evaluate, in all its dimensions, students’ off-site work. The goal is to be able to process all the gathered information to improve and adapt the content of in-class course materials, and increase students’ motivation and participation in lectures, while providing a more specific and adapted feedback to each student. This will increase the level of flexibility provided to students in their learning process by allowing them to suit such process to their particular weaknesses and strengths [3]. Attending to such general goal, the following challenges are formulated:

- Integrate off-site work into the general dynamics of the course.
- Determine which activities are most suitable for the different learning outcomes.
- Assess the degree of achievement of students for these learning outcomes.

- Know students' motivation and satisfaction with off-site work.
- Adjust the rhythm of in-site classes and activities according to the feedback provided by students [4].

To achieve these goals, TASCA aims at using already existing tools to get information and evidences about students' off-site work, evaluate it in a coherent and suitable way [5], and guide students into achieving the courses' learning outcomes. The selected set of tools should assist teachers in:

- Getting concrete proofs of off-site work, including those not reflected in a deliverable.
- Estimating the time students devoted to the task.
- Analysing students' workload.
- Getting students' opinion about the activity, degree of satisfaction and usefulness.
- Obtaining information about the work process, not just about the obtained result.

This will unify and give coherence to the whole learning-teaching process, removing the great barrier existing between the evaluation, monitoring, and feedback of in- and off-site work [6].

The benefits that this approach may provide to both students and teachers include, but are not limited to:

- Increasing feedback to students about their work, including organisation and process, not just the final result.
- Increasing feedback to teachers through students' opinions and suggestions, which could help to adapt and improve the courses and both the in- and off-site work.
- Promoting reflexive activities to improve the students' analysis and criticism capacities.
- Generating more active, dynamic, and participative off-site work. This may continue in a fluid and natural way in the classroom.
- Increasing students' motivation.

3 PLANNING

The work in TASCA's project has been scheduled in the following stages:

Stage 1. State of the art: The search for information, documentation, and references has been focused on two main areas considered of prime importance for the project:

- References about off-site work and tools and processes for its monitoring and quantification
- Search, analysis, and selection of tools enabling the recollection of information about off-site work.

At a first moment, we thought of using tools like those employed by companies for tasks management. These project management tools enable managers to add new projects, add people to projects, impute a number of hours to people, etc. Although most of these tools are available for a fee, there are also some open-source free ones, like TRAC [7] or REDMINE [8]. However, these tools are usually very complex and may hinder the recollection of information, so we selected simpler tools, such as questionnaires and spreadsheets as we describe in the project stage 2, hereafter.

Stage 2. Tools definition: Different questionnaires and spreadsheets have been designed, during the first half of the academic year, in order to collect and analyse information about off-site work. These tools have been adapted according to teachers' criteria, course, kind of activity, and work to be performed by students.

- Questionnaires comprising questions, opinions, and comments about the task performed. They include questions about the time and effort devoted to the activity, its suitability and usefulness. These questionnaires were handed as part of the deliverable, and they were proposed for both short (one week) and long (4-5 weeks) duration activities.
- Spreadsheets use to estimate students' off-site dedication to different courses along their whole duration (12-14 weeks). This spreadsheet was available as a "Task" in UPV's online

learning environment (PoliformaT [9], a customised instance of SAKAI). Students had to fill out this spreadsheet reporting the time devoted to study, completing tasks, and other activities, for each of the selected courses.

Stage 3. Use of questionnaires and spreadsheet. The defined mechanisms for collecting information about students' off-site activity have been applied in the second half of the academic year. Due to the multidisciplinary nature of the team of teachers conforming TASCA, the questionnaires have been adapted for each particular case, taking into account aspects like degree, students' profile, characteristics of the course, and the kind and duration of the work to be done,

These mechanisms have been applied to different Bachelor's Degree and Master courses, with annual or triannual duration, and even transversal courses (courses mixing students from different years).

Stage 4. Analysis of results. Information collected during stage 3 has been analysed, taking into account the different kind of proposed activities. This study has detected a number of common mistakes, so questionnaires and spreadsheet have been adapted and improved accordingly to try to achieved the proposed goals.

4 TARGETS AND TOOLS

The different courses that have acted as targets for this first attempt to assess and extract useful information from students' off-site work are depicted in Fig. 2.

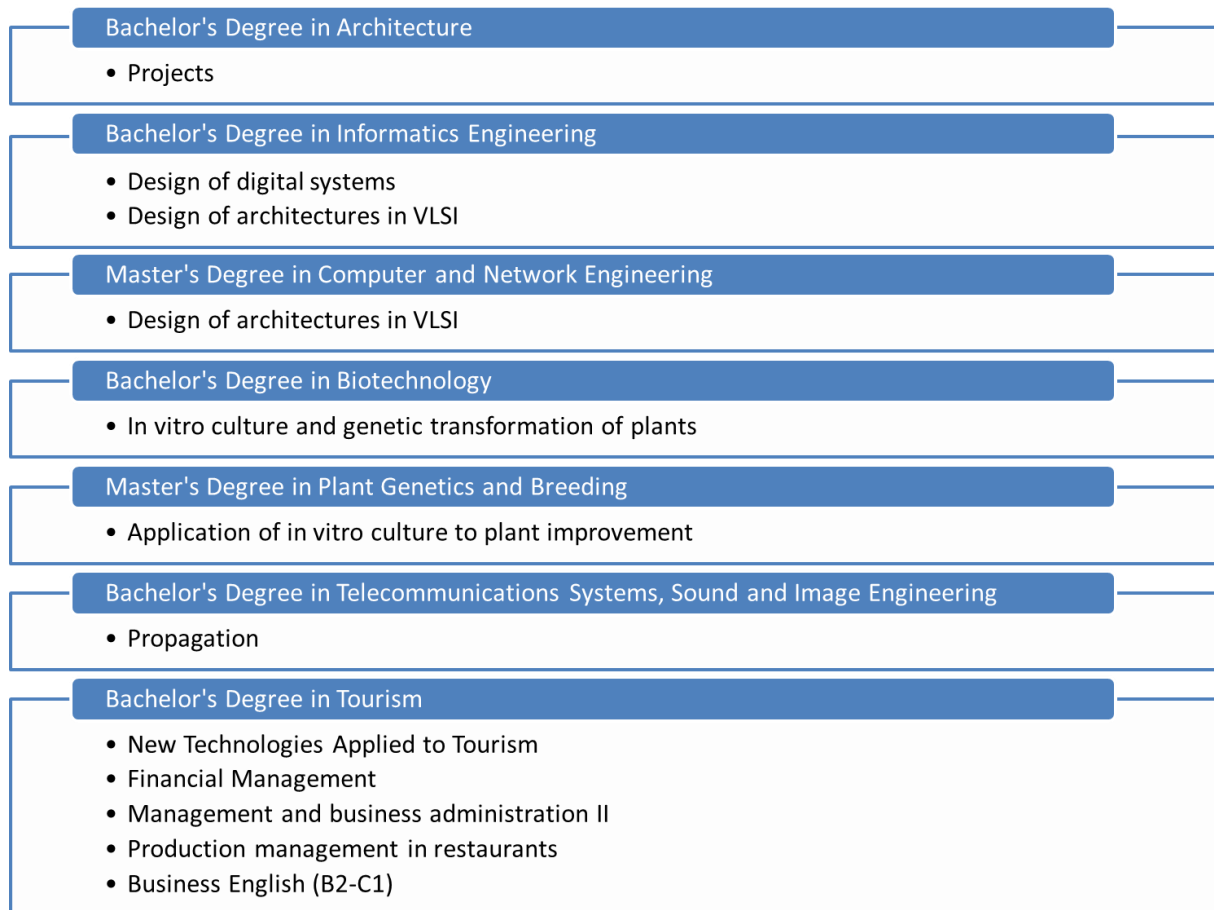


Fig. 2. List of target courses.

As previously stated, two different kind of tools have been used to obtain the desired information about students' off-site work: questionnaires and spreadsheets.

4.1 Questionnaires

This type of mechanism consists in a series of open questions to gather information and get immediate feedback about an off-site activity, usually of short duration. The questionnaire was part of

the deliverable of the associated activity, so information could be quickly gathered in a fluid manner. Students' answers are more reliable when they fill out the questionnaire just after finishing the activity, as their work is done very recently and they have a very clear opinion about it. So these data are very useful to get immediate feedback about off-site work.

Table 1 lists the different kind of off-site activities considered in the context of this work and the questions students should answer. This approach was used in all the target courses but those belonging to the Bachelor's degree in Tourism.

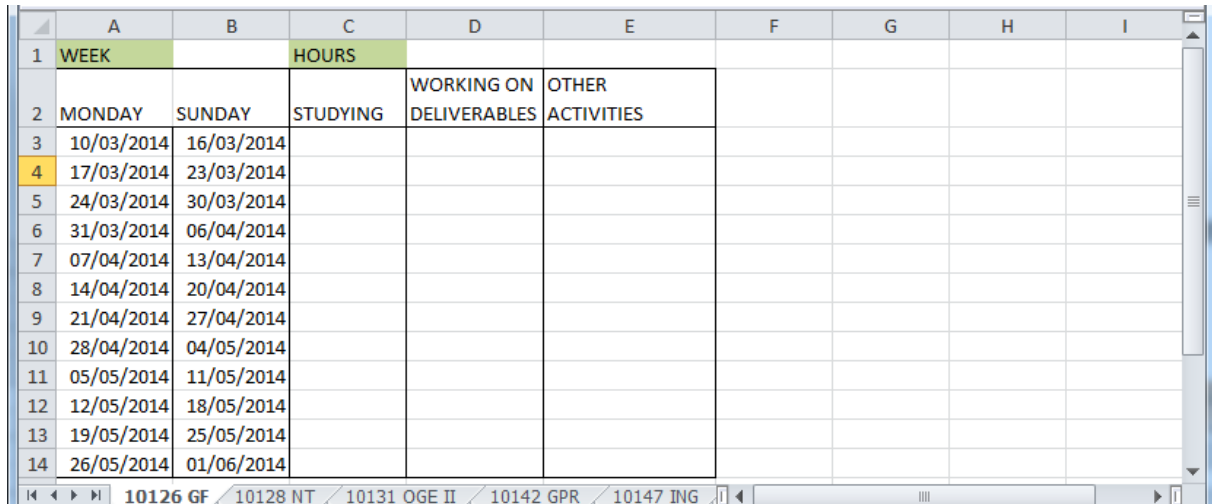
The "Propagation" course is a particular case as, in a first attempt to gather information about their off-site work, very few students delivered the questionnaires. So, a second attempt was made but, in this case, delivering the questionnaire was rewarded with a small bonus in the mark of the associated exercise. This clearly motivated students as about 70% of them handed out the exercise and questionnaire.

Table 1. Analysed off-site activities through the associated questionnaires.

Course	Off-site activity	Questionnaire
Design of digital systems Design of architectures in VLSI	Reading a scientific paper previous to the lecture focusing to that topic, and answering a number of relevant questions.	What is the most interesting idea you have learned? Why? What question would you like to have answered in the next lecture? Why? What is the most obscure point of the topic? Why? What part of the topic does not require further explanation after reading the paper? Why? How much time (in minutes) have you required to read the paper and answer these questions?
Projects	Applying the contents of a lecture to students' projects.	Is the main concept of lecture clear? Do you have any doubts? Have you found it difficult to apply it to your project? Why? Has this exercise helped you in clarifying the main concepts of the lecture? Do you have new questions or doubts after making this exercise? Which ones? How much time (in minutes) have you required to review the lecture and make the exercise (including this questionnaire)?
In vitro culture and genetic transformation of plants Application of in vitro culture to plant improvement	Searching a paper, extracting information as shown in lectures, and preparing a presentation about the paper's contents.	How much time have you required to select the paper? Has it been difficult to comprehend and extract the information? Why? What is the conclusion of the paper? Have you acquired new competencies and/or knowledge? How much time have you devoted to work on the paper and prepare the presentation?
Propagation	Solving a long problem about the content of two lectures. Students had 15 days to deliver the solution.	How much time (in hours) have you required to solve the problem? Did it allow you to review and better understand the contents of the lectures?

4.2 Spreadsheet

This approach has been applied to the courses belonging to the second term of the third year of the Bachelor's Degree in Tourism. Students were asked to register all the off-site work devoted to the different courses they were enrolled during this semester. Unlike questionnaires, this approach only takes into account the time devoted to different activities considered relevant, including "studying", "working on deliverables", and "other activities". To get reliable information about students' off-site activities, they were asked to fill in the information on a weekly basis. Longer time will result in less reliable data and shorter periods will burden students with unnecessary workload. The design of the spreadsheet is depicted in Fig. 3.



1	WEEK		HOURS						
2	MONDAY	SUNDAY	STUDYING	WORKING ON DELIVERABLES	OTHER ACTIVITIES				
3	10/03/2014	16/03/2014							
4	17/03/2014	23/03/2014							
5	24/03/2014	30/03/2014							
6	31/03/2014	06/04/2014							
7	07/04/2014	13/04/2014							
8	14/04/2014	20/04/2014							
9	21/04/2014	27/04/2014							
10	28/04/2014	04/05/2014							
11	05/05/2014	11/05/2014							
12	12/05/2014	18/05/2014							
13	19/05/2014	25/05/2014							
14	26/05/2014	01/06/2014							

Fig. 3. Spreadsheet design.

This spreadsheet collects information from 12 weeks, beginning on the week starting on Monday 10th March 2014 until the week starting on Monday 26th May 2014. The information for the first three weeks of the courses is missing, but the off-site work in these weeks is usually negligible. Likewise, we lack information about the final period of the term, between the end of the lectures and exams, in which student's off-site work is surely very important.

As this activity was not related to any content of the different courses, it was published as a voluntary task in UPV's learning platform. Hence participating students were rewarded with a 10% of the final mark to motivate their participation. Among the participant, there were roughly 20 students that took all these courses, and between 10 and 20 more that took just some of them.

5 RESULTS

Despite the heterogeneity of target courses, off-site activities, and their duration, all the gathered information provides quite useful insights about how to improve these activities and, in general, the courses. These results can be better analysed from the perspective of the kind of mechanisms used to collect the information, and thus the very nature of the collected information.

5.1 Questionnaires

It must be noted that questionnaires provide very useful information not only about the time students devoted to the activities, but also about the suitability and usefulness of the activity from students' perspective. These data have enabled us to modify the proposed activities in order to make them clearer, more challenging, and more appealing to students. Due to the heterogeneity of target courses is not feasible to go through all the subtleties of modifying each of the proposed activities, but the collected data have surely contributed to improving all of them.

Nevertheless, information related to the time students' devoted to off-site work has been processed exactly in the very same way. On the one hand, the marks obtained for each student in the proposed off-site activity has been plotted with respect to the time it took the student to complete the task. This will help us to determine whether there is any relationship between the time devoted to the task and the marks obtained. As an example, Fig. 4 depicts the results obtained for the activity related to searching for a scientific paper, analysing it, and preparing an oral presentation. The very same

activity was proposed in two different courses, from the “Bachelor's Degree in Biotechnology” and the “Master's Degree in Plant Genetics and Breeding”. This particular activity has been selected because it exemplifies the different cases that have appeared when analysing the whole set of proposed activities.

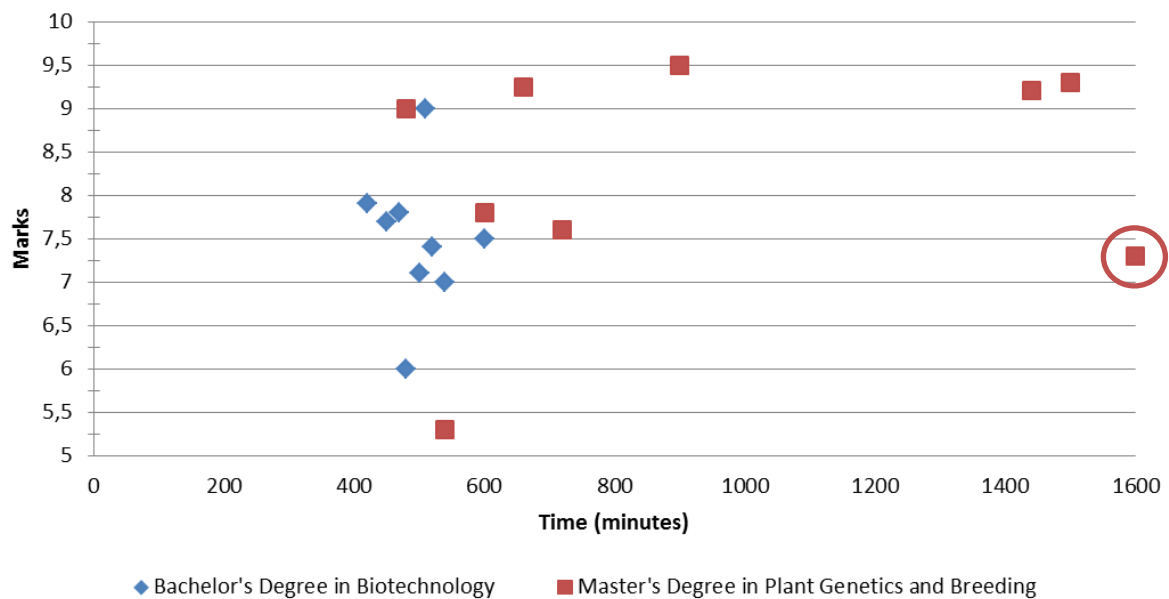


Fig. 4. Relationship between marks assigned and time devoted to the task.

The first thing to be noted is that it does not seem to be any clear relationship between the assigned marks and the time devoted to the task. There exist high marks for deliverables declaring relatively little time, and low marks for deliverables that reported a long time to complete.

However, with this kind of graph it is easier to detect possible problems. For instance, the case of the student reporting the longest time devoted to the task (highlighted with a red circle in Fig. 4). It must be noted that this task was supposed to be finished in about 10 to 12 hours (600 to 720 minutes) and the student required more than twice this time to finish it. For such an effort, the student did not get as a good mark as it could have been desirable. This could probably point out to some difficulties with the content of related lectures, for instance, and a meeting with the student for clarification and guidance may be in order.

On the other hand, it is easy to see that the time devoted by students from these two courses fall into very different ranges. That is why, the cumulative distributed function (CDF) of students having finished the activity in a given time has also been plotted for all the target courses. Fig. 5 depicts this function for the activity proposed in the “Bachelor's Degree in Biotechnology” (left) and the “Master's Degree in Plant Genetics and Breeding” (right).

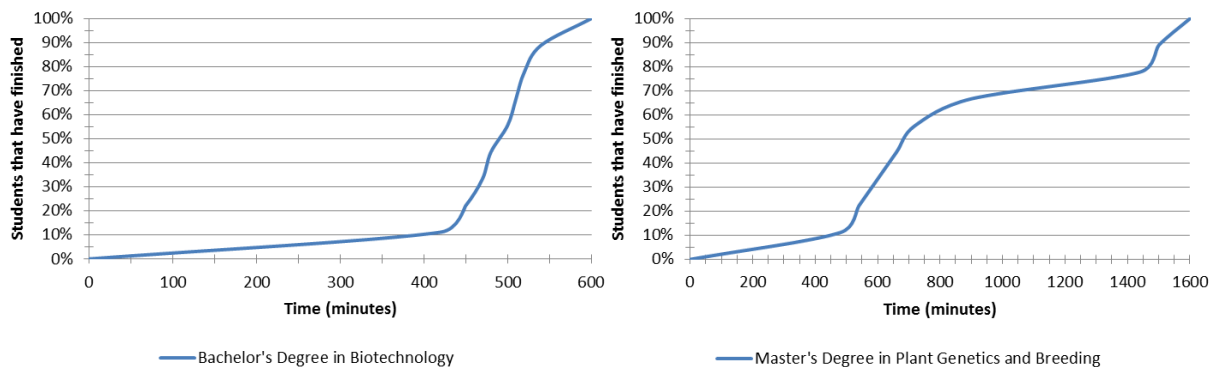


Fig. 5. Cumulative distributed function of students having finished the activity in a given time.

As can be seen, all the students from the “Bachelor's Degree in Biotechnology” finished the activity before the estimated time (600 to 720 minutes). Nevertheless, it seems that the task is not too easy either, as barely any student completed the deliverable in less than 450 minutes.

In the case of master students just about 40% of them finished the task in that time. In fact, twice that time was required for 80% of students to finish the activity. This clearly points out a problem that could be related to the heterogeneity of students enrolled in the master course, whereas degree students have a more homogenous profile that better fits the task at hand. Probably, it could be a good idea to complement the task for master students with a previous lecture or activity for them to acquire a homogeneous knowledge.

5.2 Spreadsheet

Through the use of the proposed spreadsheet we gathered information about students' off-site work in five different third year courses, running in parallel, of the "Bachelor's Degree in Tourism". Although the collected information was related to different aspects, such as "studying", "working on deliverables", and "other activities", we have decided to add all these contributions to have a rough idea of the time devoted to off-site activities for each of the considered courses. Fig. 6 depicts the mean time students devoted to off-site work, for each course, for the 12 weeks covered by the analysis (weeks 4 to 15).

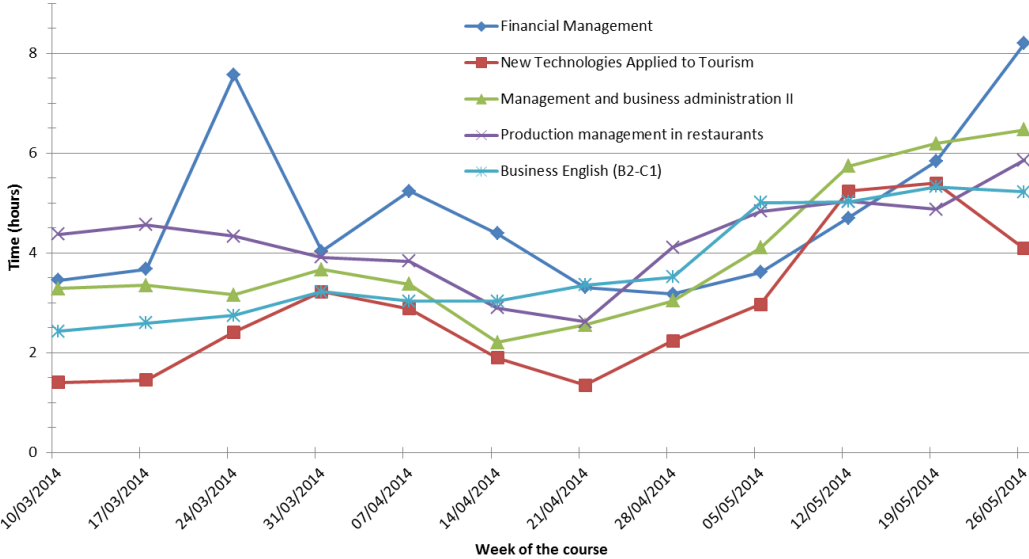


Fig. 6. Mean time devoted by students to each course on a weekly basis.

In order to ease the comparison among the different courses, it is necessary to take into account the number of ECTS (European Credit Transfer and Accumulation System) credits for each course. Fig. 7 shows the mean time students devoted to off-site activities normalised with respect to the ECTS credits for each course.

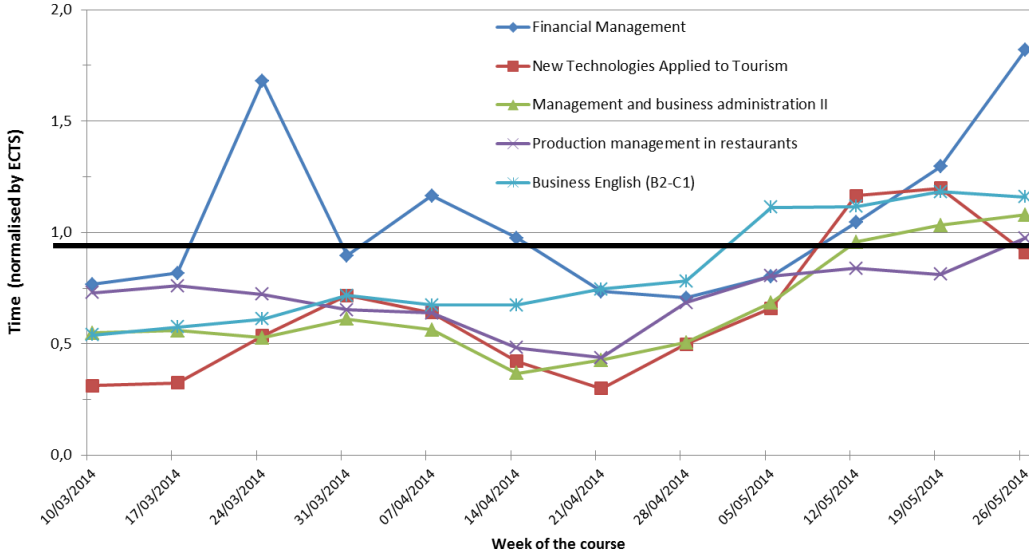


Fig. 7. Mean time devoted by students to each course, normalised by ECTS, on a weekly basis.

In the UPV, 1 ECTS credit accounts for 10 hours of in-site activities and 15 hours of off-site activities. Taking into account that 1 semester consists of 15 school weeks, it can be concluded that 1 ECTS credit accounts for 1 hour of off-site activity per week. Accordingly, the normalised value 1 in Fig. 7 can be interpreted as the off-site work students should perform each week.

As can be easily seen, the time devoted by students to off-site activities for most of the courses is well below the threshold established. In fact, when considering the mean values for each course, listed in Table 2, it is clear that students' dedication for no course reaches the required 15 hours per week. Either students are not devoting the adequate time to these activities or teachers have not carefully adjusted the time required to complete these tasks. Although data related to the period of study previous to final exams (very significant) and the beginning of the course (few significant) is missing, it is clear that assessing the off-site work is very important to carefully plan the proposed activities and improve the courses' syllabus.

Table 2. Analysed off-site activities through the associated questionnaires.

Course	Total (off-site hours)	ECTS (credits)	Total/ECTS (off-site hours/credit)
Financial Management	57,19	4,5	12,71
New Technologies Applied to Tourism	34,58	4,5	7,68
Management and business administration II	47,16	6,0	7,86
Production management in restaurants	51,25	6,0	8,54
Business English (B2-C1)	44,50	4,5	9,89
All courses	234,68	25,5	9,20

The analysis of the waveforms depicted in Fig. 7 shows a clear trend for all these courses. There is a small peak of off-site activity during the end of March and beginning of April, probably due to midterm examinations. Then, the scarce off-site activity decreases even more at the end of April due to Easter holidays. Finally, off-site activity begins to rise steadily as the end of term approaches.

As all the courses follow the very same patterns, it is easy to find in the term periods of very low activity, and periods of heavy workload for the students. It could be interesting to coordinate the requested off-site work for all the courses of the same year and term, so students could face a steady demand along that term. This could surely improve students' motivation and dedication, and the quality of the degree as a whole.

6 CONCLUSIONS

TASCA members have examined the obtained results, first individually (each teacher his/her course) and then in-group (comparing different courses and degrees), and the following conclusions have been drawn:

- Evidently, the greater the amount of information about students, the larger the number of criteria and possibilities teachers would have to improve their teaching. This information enables a better organising and structuring of courses, and ensures a fair and objective evaluation. "Knowledge is power" is undeniable and if this power is channelled towards a better teaching, the teaching-learning process and students' results will greatly improve.
- Judgemental, opinionated, and/or opportunistic information is a basic feedback to complete students' formative assessment. Usually, teachers only have information about students' results, but if this mutual interchange is brought into off-site work, teachers have a complete picture to detect rights and wrongs in the teaching-learning process. Periodically determining the students' degree of satisfaction with the course, in-site and off-site activities is a valuable tool to adjust the course, its syllabus, timetable and activities.

- Collected information can be also used to detect learning problems. When a student provides an excellent deliverable in little time, it may show its efficiency, but when it takes too much time, it could be useful for the student to learn management and organisation to make profitable his/her effort. If the student took way too much time to provide a poor deliverable, then it is necessary to determine what the problem of the student is, but if the poor work was delivered in no time, this is usually the origin of the problem.

After this initial step towards obtaining information about students' off-site work to improve activities and courses, TASCA's future work aims at defining a common approach to obtain this information that could be regularly deployed in all our courses. Hence this practice could be seamlessly integrated into the teaching-learning process, favouring a lifecycle for monitoring, analysing, and improving our courses. The deployment of this approach into all the courses of a given year to analyse inactivity and heavy workload periods, and to improve each of these courses individually and the degree as a whole, is also part of TASCA's goals in the near future.

ACKNOWLEDGEMENT

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