

THE INTEGRATED PROJECT AS A LEARNING EXPERIENCE

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Abstract

Florida Universitaria is a higher education centre specialising in technical and business training among other specialist areas. Postgraduate programmes, graduate programmes, vocational training, secondary education, further education, occupational training and languages are taught at Florida. An educational model in accordance with the requirements of the European Higher Education Area has been designed, focussing on teaching for professional competencies. We have chosen to use a methodology which enhances the development of skills and abilities as well as collaborative learning. Also, it is student-oriented as students must search for knowledge by themselves thus connecting the educational and the real world. In the different university degrees taught in our centre, each year students carry out a project which is set in a real context. This project integrates specific competencies from the course subjects and also, it develops transversal competencies associated with the project which are the purpose of planning and progressive learning: team work, effective communication, conflict resolution, leadership skills, innovation and creativity. The integrated project (*IP*) accounts for 25% of each course in terms of objectives, scheduling and final assessment. The grade achieved by every student in the *IP* is also part of the student's final grade for every subject involved in the project (i.e. the above-mentioned 25%).

The results presented here show that the *IP* has not benefited the "bad" students and penalised the "good" ones, as a significant number of students and teachers might have thought at first. The added value of this methodology is the transversal competencies and skills that students can acquire.

Keywords - Integrated project, teamwork, assessment of specific and transversal competencies.

1 INTRODUCTION

According to the Royal Decree 1393/2007, 29th October which establishes the organisation of official university studies, the new organisation of university studies not only responds to a structural change but also inspires a shift in teaching methods. Curricula leading to the achievement of a degree should consider the acquisition of competencies by students as the core of their objectives. Learning methods for these competencies as well as the procedures for assessing the way in which they are achieved should be emphasised. One of these methods is project-based learning.

The project-based learning methodology leads to a higher degree of participation by students, abandoning traditional methods which focussed on memorisation so that the focus is now set on a more challenging and complex method in which an interdisciplinary focus is used, instead of one per area or subject; thus cooperative work is stimulated (Anderman & Midgley, 1998; Lumsden, 1994). Project-based learning involves forming teams made up of students with different profiles to offer them great learning opportunities and consequently, to train them to work in a diverse environment in the global economy (Vázquez, Barrabtes & Rosel, 2000).

It is an active and participatory teaching-learning methodology in which students think and act upon the project, developing a work plan with defined strategies in order to achieve the final product suggested by the



course teaching team. The methodology is student-oriented and resolves real world problems, establishing connections between competencies related to study, life and work, offering opportunities for feedback and evaluation by experts, also, allowing reflection and self-evaluation by the student. (Katz & Chard, 1989; Martin & Baker, 2000).

Among the benefits this methodology contributes to the learning process, we can point out:

- The development of skills and competencies such as collaboration, communication, decision-making and time management (Díaz De Miguel, 2005)
- The integration of learning between the educational centre and reality. Knowledge and skills are better retained when one is committed to stimulating projects, (Santillán Campos, 2006). Through projects, students use higher level thinking skills instead of memorising facts in unconnected and isolated contexts. In other words, it is easier to learn through familiar situations in which a certain knowledge can be applied
- The development of collaborative skills to build knowledge. Collaborative learning allows students to share ideas together, express their own opinions and negotiate solutions; all of these are necessary skills in future jobs. Working collaboratively implies much more than simply putting students to work into teams. Real team work must be achieved. The key is inter-dependence, the team members must rely on each other and trust the understanding and success of each person (Adriana & Velez, 1998)
- The development of skills for problem solving
- Allowing relationships of integration among different disciplines to be established. (Dickinson et al., 1998; Bottoms & Webb, 1998)
- Stimulating an intrinsic motivation to learn, i.e. there is an interest in the subjects to be learnt, since the Project implies a challenge to the students (Moust, Bouhuijs & Schmidt, 2001). In summary, basic learning in projects leads to students acquiring knowledge and basic skills, learning to resolve complex problems and carrying out difficult tasks using these skills and knowledge

For the implementation of this methodology in our Center, have teamed up with the support and advice of specialists from the Chemical Engineering School of University of Rovira i Virgili (URV), who have more than 15 years of experience in the application of this methodology. (Garcia & Font, 2001; Jörg et al., 2006).

In the different university degree courses taught in our centre, all students must carry out a project set in real contexts in each academic year. The project integrates specific competencies of the course subjects, and develops transversal competencies associated with the project, which is the aim of planning and progressive learning. In Fig. 1 the aforementioned transversal competencies and their planning in the four corresponding degree courses are shown:

Year	Competences		
1	Team Work		ICT
2	Initiative Innovation Creativity	Communication	
3		Permanent Learning	Conflict Solution
4			Compromise and Ethics Responsibility Leadership

Fig.1. Transversal competencies

These competencies have been chosen after analysing reference models such as the Tuning Project (González & Wagenaar, 2003), Libro Blanco ANECA, (Aneca, 2005) and model of the URV (Garcia & Font, 2001; Jörg et al., 2006).

The project carried out in each specialist area and each academic year is different and covers such diverse areas as “Strategic analysis of the furniture sector, “Analysis of a soldering robot” , “Designing your dream school”, “Creating innovative business in the tourism sector in the Autonomous Community of Valencia”,...

In the academic year 2010-2011, this methodology was applied to all first year students in all the subjects taught in every degree program. In the current academic year 2011-2012, it has been applied to second-year students. The same methodology will be applied to third- and fourth-year students next academic year.

In this article we wish to present the structure of the Integrated Project (from now on called *IP*) at Florida Universitaria and show how it is developed and assessed. Secondly, assessment and grades achieved during the academic year 2010-2011 in the first year of our Degree in Business Management and Administration will be described. Finally, the main conclusions will be presented.

2 THE INTEGRATED PROJECT AT FLORIDA UNIVERSITARIA

Our *IP* consists of the resolution of a problem from a real context, integrating specific competencies from the corresponding course subjects, and developing the aforementioned transversal competencies associated with the project (Fig.1.). The *IP* accounts for 25% of each course in terms of objectives, scheduling and final assessment. The grade achieved by every student in the *IP* is also part of the student’s final grade for every subject involved in the project (i.e. the above-mentioned 25%).

The *IP* is carried out by groups of students who are members of a team and it is assessed jointly by all teachers involved in it. The teams are made up by the project Coordinator, based on the results of the Belbin Test (Belbin Team-Role Profile Questionnaire, www.belbin.com) and consist of 6 to 8 students. Each team has a team Leader who is one of its members and leads the team to implement the project objectives. Each team leader is assisted by the Secretary, who develops administrative tasks, such as writing minutes.

The Coordinator chooses the leader, using the information obtained in the Belbin Test, which provides the most suitable profile for that role. Once constituted as a team, the students then choose the Secretary.

All the teaching team in each course participates in a coordinated way and their tasks are managed and monitored by the *IP* coordinator. Furthermore, the IPMP (Integrated Project Managers Unit) has been created, to provide a scenario to share experiences, coordinate and revise projects, as well as solving different types of problems which arise in different groups. This Unit is made up of the different degree course coordinators. Finally, the Trainer is an expert in transversal competencies, whose role implies providing training seminars to students.

2.1 How the integrated project is developed: Methodology and resources

As mentioned above, the project-based learning methodology is active, and for this reason student participation is required on different levels:

- Specific seminars, provided by the trainer for the development of transversal competencies as shown in Fig.1. Currently, “Team work”, “Information and Communication Technology (ICT)”, “Communication” and “Innovation and creativity” are taking place both in the first and second year degree courses.
- Meetings between the teams and the *IP* coordinator in order to ensure that deadlines are being met according to planning. Moreover, processes and outcomes are checked, and possibilities for improvement and diverse needs are also identified. These meetings are included in the teaching staff weekly schedule.
- Classroom sessions for each subject with the guidance of the corresponding teaching team, where objectives assigned to the project by teaching staff are developed. 25% of the teaching time is allocated to each subject. It is then when students work on tasks so as to meet the objectives set by the teacher.
- Individual and team-work sessions, additional to the ones previously mentioned – determined by each team according to necessity, always bearing in mind the objective of achieving the outcomes established in the project while meeting deadlines. The team leader and secretary must, along with other tasks, propose an agenda for the sessions. One or two hours are assigned to these sessions.

Students also have an area on the Florida Campus online platform where they can get access to all the documentation related to the seminars also, with resources available to develop the project. Each team can also share documentation, participate in the forum and upload minutes from work meetings in this virtual learning environment.

2.2 How the integrated project is assessed

For the *IP* assessment, each team has to create and submit the following each semester:

- A Planning Report (*PR*), which is worked out at the beginning of each semester and includes: the project proposal, objectives to be reached and their relation to the subjects each semester, timing and organisation thereof, and rules on how the team is to be run. This represents 15% of the total *IP* assessment.
- A Final Report (*FR*), which includes the project description, results showing that proposed objectives have been reached, and conclusions. This represents 40% of the total *IP* assessment.
- A Poster or PowerPoint presentation of the results (*PO*) used as visuals during an interview with a panel. In the first semester a poster is used and in the second, a presentation with PowerPoint slides. In these, objectives must be referred to, the working procedure being followed, the results obtained and final conclusions. This represents 20% of the total *IP* assessment.
- The Project Interview (*PI*), which is carried out once each semester has finished, consists of a dissertation making use of the poster in the first semester and the PowerPoint slides in the second. In these sessions, teachers interview students to assess their level of knowledge acquisition and development of social competencies. This represents 25% of the total *IP* assessment.

For every one of the above tools, students have guides which include steps to follow and criteria to be considered in the assessment. Both the project coordinator and all subject teachers take part in this assessment.

One part of the grade obtained is the same for all team members, however, a part of the grade is individually assigned so that belonging to the same team the project grade for each member is individual and represents 25% of the grade in all subjects in which they participate.

In conclusion, each grade in each semester is calculated as follows:

$$PIGrade = (PR \times 0.15 + FR \times 0.40 + PO \times 0.20) \times IPF + PI \times 0.25 \quad (1)$$

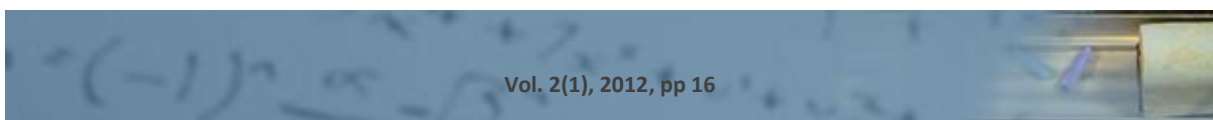
Where, the *IPF* (Integrated Project Factor) is the multiplying factor resulting from:

- Peer assessment, which consists of a questionnaire on each member's contribution to the team regarding task completion, quality, meeting deadlines and participation in the distribution and coordination of all areas.
- Team member assessment carried out by the coordinators based on: training session attendance and project meetings for each subject; information obtained from minutes by the team leaders; and the coordinator's own view of involvement and work carried out by each of the team members.

This multiplying factor is applied to team grades and corrects the rise or fall of the individual grade, having three values: 0.75 - 1 - 1.25. In specific situations, such as dropout or difficult situations, the coordinator can apply a 0 to the multiplying factor.

If a student's peer assessment and coordinator's assessment is very low, the student is penalised and the corresponding team grade is lowered by 0.75, i.e. the team grade is lowered 25%. On the other hand, if assessment is very high, the corresponding team grade is rewarded 1.25 i.e. the team grade is raised 25% in comparison with their classmates.

Fig. 2 illustrates this assessment:



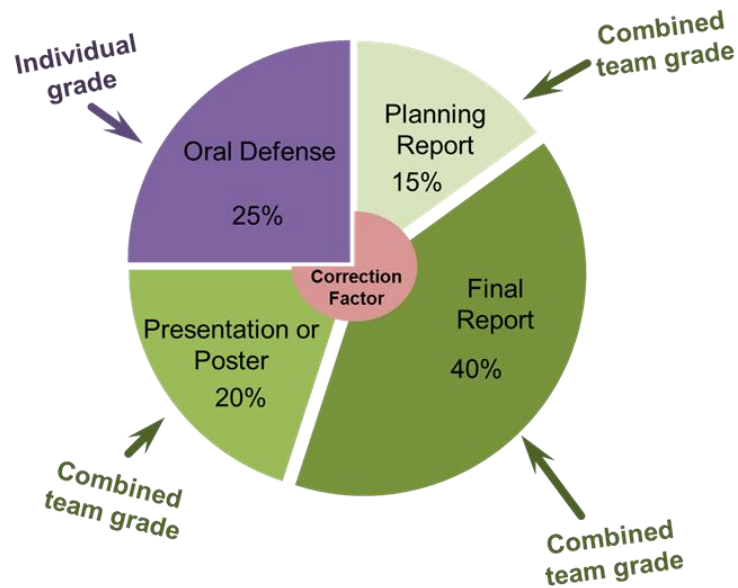


Fig.2. Integrated Project Assessment (IPF) system

3 RESULTS

In order to illustrate assessment of results, we have used those achieved by the first-year students of the Business Management and Administration Degree, academic year 2010-2011. The suggested *IP* title "Strategic Analysis of a featuring sector in the Autonomous Community of Valencia", consisted of carrying out an analysis prior to the development of a business project. It was necessary to know the environment and economic sector in which the future company would be classified as well as the company's competitive features.

First of all, students had to be able to identify the different variables which affect the company on two levels, i.e. environment and sector and competition; secondly, they had to be able to explain and evaluate the influence of those variables on the future business project, qualifying this influence as an opportunity (a favourable influence) or threat, (an unfavourable influence), and establishing the strategies to follow in order to boost opportunities or reduce threats.

Firstly, we will compare the *IP* grade obtained by the different teams. In the Business Management and Administration Degree, our students are given the chance to choose whether they prefer to register in morning or evening groups. The latter were originally thought for those students who work and are willing to do undergraduate programmes. In the morning group ten seven/eight-member teams were formed, while in the evening group five four/five-member teams were made up. In the evening groups we decided that teams had fewer members because there were fewer students registered.

Table 1 shows the combined grade obtained by each team, marked out of 10. This grade represents 75% of the total *IP* grade. As we can see from this table, there are differences in the morning group and the evening group. The morning group's grade was lower than that of the evening group.

This difference could be somehow due to the fact that the evening groups' profiles were different in that in general, they were more mature students, combining work and studies.

The only exception in the morning group was team 3, who achieved a very high grade. The members of this group were people with a very good academic record.

We also found that in the evening groups, team 5 had a worse result compared to the other teams. Most students in this team were, unlike the rest, young people no combining work and studies, with little motivation, in fact, most of them have dropped out of their studies. These situations are difficult to foresee, as the coordinator shapes the groups based on the Belbin Test, which defines the roles each person takes on in their team. However, this test does not provide us with information about the academic capacity of those assessed.

	Morning group	Evening group
Team 1	5.63	8.29
Team 2	6.51	8.17
Team 3	9.10	8.34
Team 4	7.32	8.73
Team 5	7.04	4.55
Team 6	7.64	
Team 7	9.16	
Team 8	6.82	
Team 9	6.39	
Team 10	6.61	

Table 1. Team grades according to timetable

As was expected, and as we will be able to see from the results we will observe later, the students who were penalised had mediocre academic grades, whereas those students who had been positively evaluated assessed by their team colleagues had excellent academic grades.

Finally, regarding the correction factor for the team assessment (*IPF*), out of 86 students this factor was applied downwards to 13 and upwards to 25. We must remember that it was also possible to apply 0.00 to the team grade in extreme circumstances where students didn't attend or participate in the *IP*. This extreme measure was taken in the case of 7 students: 6 of 7 students had 0.00 due to the not unreasonable assistance at meetings of the *IP* (specific seminars, team-work sessions, meetings between the teams and the *IP* coordinator), and 1 student to generate conflicts in the team because of his disrespect to the rest of the team mates.

Secondly, Table 2 shows the influence the *IP* grade can have on students' academic grades. We have compared the individual grade students were rewarded in the *IP* with the grade obtained in four subjects studied in the first year. To carry out this comparison, we calculated the grade they would have been rewarded in the subjects without the *IP*.

	Subject 1	Subject 2	Subject 3	Subject 4
Failed with and without <i>IP</i>	4	37	54	24
Passed with and without <i>IP</i>	80	44	26	57
Passed with <i>IP</i> who would have failed without <i>IP</i>	2	5	6	5
Failed with <i>IP</i> who would have passed without <i>IP</i>	0	0	0	0

Table 2. Students who passed and failed in different subjects considering the influence of the *IP*.

In Table 3 we have calculated the average grade obtained by students from each subject with and without *IP*, dividing students into 4 sections according to the grades achieved in the project.

	Subject 1		Subject 2		Subject 3		Subject 4	
	With <i>IP</i>	Without <i>IP</i>	With <i>IP</i>	Without <i>IP</i>	With <i>IP</i>	Without <i>IP</i>	With <i>IP</i>	Without <i>IP</i>
0	4	5	2	2.6	1.5	1.9	2.1	2.6
From 0 to 1	6	6.5	2.8	2.4	2.4	2	4.7	4.8
From 1 to 1.5	6.8	6.9	4.6	4.3	2.8	2.3	5.9	5.8
From 1.5 to 2	7.4	7.2	6.8	6.4	5.6	5.2	7	6.6
2	8.1	7.7	8.9	8.6	6.8	6.3	7.9	7.4

Table 3. Average subject grades grouped by project grade achieved.

From Table 3 we can infer that the higher the grade the student achieves in the *IP*, the higher the average subject grade, whether the project grade is taken into account or not. The majority of students who achieved a higher grade in the *IP* also achieved a higher grade in their other subjects, irrespective of the use of the *IP* as a

methodological instrument. Furthermore, the difference between grades measured with and without the *IP* grade is small.

Finally, we have analysed the influence of the *IP* on the number of subjects students passed. We compared the number of subjects students passed with the grades students achieved in the *IP*.

The results were:

- 81.4% of students passed the same number of subjects irrespective of whether the *IP* grade is taken into account or not, and only 18.6% passed more subjects thanks to the *IP* grade (although in most cases it was only one subject)
- the higher the grade achieved in the *IP*, the higher the number of subjects passed.

4 CONCLUSIONS

The results presented in the previous section allow us to draw some conclusions. Very few students benefited from the *IP* grade to pass the subjects, as the majority passed or failed (more than 92% in all cases) irrespective of this grade. The *IP* has not benefited the “bad” students and penalised the “good” ones, as a significant number of students and teachers might have thought at first. The added value of this methodology is the transversal competencies and skills that students can acquire, as they themselves state:

“The objective of this project is to grow. This isn’t the first project I have worked on, but it’s the first time I’ve ever coordinated a team. From my point of view this requires minimum competencies I can develop. However, putting this into practice will not be easy. This work will help us both academically to achieve basic knowledge related to each subject, and also as a personal experience acquiring communicative skills for our professional future, and what I call “PMA”, i.e. a positive mental attitude towards all those obstacles that will surely arise as we develop our project.”

A. *Liseth, a Business Management and Administration Degree student.*

“From my point of view, the objective of the integrated project is to work in a team effectively and once achieved, to have the self-confidence to deal with all kinds of people, in order to achieve perfection in your career. Everyone can contribute their best and at the same time their peers can learn from each other. I would like to highlight this quote: ‘The function of an organisation is to make the human force productive and this is achieved building upon the positive qualities of people, not regretting their limitations.’ (Peter Drucker)”.

B. *Raquel, a Business Management and Administration Degree student.*

The results obtained at the school of the Chemical Engineering School of University of Rovira I Virgili go in the same direction, as the feed-back of their graduates and employers is that the skills they have acquired together with technical capabilities have allowed them to adapt suitable way in their jobs. (Garcia & Font, 2001).

Project-based learning has enabled students to become more aware of the interrelations of knowledge worked on from different disciplines. Moreover, it has enabled most students to internalise and put the basic principles of team work into practice; to resolve conflicts which arose as the project developed; to accept and recognise reasoned and justified assessments and criticisms from their team mates; and to discover their strengths and those of their team mates, thus leading them to grow personally and emotionally.

On the other hand, this methodology has enabled coordinators and teachers to have a closer contact with the students, allowing a more individualised assessment of their academic progress, detecting possible deficiencies or individual difficulties on time, and allowing for preventive measures to be taken when confronting the possibility of academic failure. Besides, the convergence of different disciplines in one project has led to the need for teamwork on the teachers’ side also, bringing to an end the traditional separation of specialist areas. A space for collaboration among teaching staff has been created which has enabled us to share and resolve different pedagogical needs.

This educational model always requires a great effort both in coordination and time dedication. This entails a number of difficulties that both teachers and students were confronted with in the development of our project for the academic year 2010-2011 and which we consider worth explaining:

- The difficulty of defining a project with adequate demands on the first year students, and which would give them the opportunity to participate in all subjects

- The heavy workload on students at the end of each semester, due to poor team organisation and planning, and also, to the fact that most teachers completed at the end of the teaching period the objectives that were assigned to the project, as students initially lacked the necessary knowledge base
- Reluctance among students to work in a group with people they hadn't chosen to work with - the fact that the *IP* grade represents 25% of their grade in all subjects turned this reluctance into a major problem
- Difficulties in coordinating teachers and different subject activities
- Difficulties in determining the weighting attributed to content, competencies and skills.
- After having gained the experience of application and development of the *IP* during the academic year 2010-2011, we have decided to introduce some modifications for the academic year 2011-2012 which we believe will improve the aforementioned difficulties:
- We have not included one of the subjects, Mathematics I in the first semester, as it doesn't fit in entirely with the subject being worked on in the Project.
- We have reduced the number of team members from 7/8 to 5/6, as work organisation in larger teams implies an added difficulty for new university students who have no experience in this type of methodology.
- Very clear guidelines have been established from the outset. At the start of the academic year, *IP* coordinators have had meetings with teachers in order to explain in detail what to do and when. Thus, possible setbacks or problems that occurred in the previous academic year are anticipated, and advice is provided on how to deal with them.
- In the last academic year, there wasn't a very clear guideline on how to create the Final Report, which caused a lot of uncertainty among students and also, led them to make some mistakes. We have therefore opted for a much more detailed and clear structure this year.
- In the last academic year, the *IPF* was applied with three possible values (0.75-1-1.25). This year we have decided to offer the possibility to apply an *IPF* ranging from 0.5 to 1.25, which will allow us to adjust every student's grade in terms of their contribution to team results.

Furthermore, we face a new challenge: the current *IP* in the second-year-degree courses takes advantage of the experience gained from the previous academic year, trying to improve all those negative aspects that both teachers and students experienced in the previous year.

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