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Traditional learning versus bologna education: co-assessment and roles assignment, an experience of innovation in university teaching

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This project aims to strengthen some students' skills through a dynamic learning project aligned with the Bologna methodology. The main objective of this pilot-project is to provide the basics of the course to the student at the same time as developing different skills that they will have to use in the labour market. This teaching experience presents a co-assessment system linked to the assignment of different roles for the students. These characteristics provide an experience that is appealing and efficient for students' learning and skills development. This research offers a comparison between the Bologna methodology applied in the pilot-project and the traditional teaching methodology used in the same course during the previous academic year. This paper also provides some results and conclusions based on the Bologna Process and its implementation.

Keywords: Cooperative learning, assignment of roles, co-assessment, skills development, Bologna methodology and traditional learning methodology.

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INTRODUCTION

After the first years of the "Bologna process[2]" in higher education in Spain, and while still in a process of adaptation to the new educational paradigm, one can already observe a change in the objectives of the traditional learning process, where the balance between the transmission of technical knowledge and skills development of students, has now become a major learning objective, affecting the student's work, the role of teacher training activities and assessment systems themselves (González and Wagenaar, 2003).

One explanation for the inclusion of skills in university education is pointed out by Cowan (2006, 33) when he states that: what students learn and do, it used be obsolete, because it is what machines now do and they do it better than humans. According to this argument, students and graduates have to think more deeply and operate more consistently than ever before at the highest level of the cognitive process.

Within this context, the experience described below focuses on two concepts that will enhance the student's skills development: co-assessment and role assignment. The set of changes and adjustments that come with the European Higher Education Area (EHEA) have set foundations that focus training through the student's work and collaborative work, where the teacher's role is one of guidance (Noguero Lopez, 2005). For this reason, it is necessary to review the assessment process, which creates a dynamic framework for teaching-learning process as a whole (Martínez and Crespo, 2007), the assessment in this type of training should not be unidirectional, but together, teacher-student, hence the use of the term co- assessment.

Moreover, we propose the use of role assignment as a support tool in this activity. Role-play should be considered as an example of "learning by doing" (Barkley *et al.*, 2007), because when data is organized to address the fabric of the game, looking for information, taking notes, preparing schedules of action and putting them into practice, it favours many of the essential processes when learning (Almenar LLongo *et al.*, 2009).

The experiment was implemented on the course "Management of technology and innovation" given to a mixed group of final year degree courses in Business Administration, Economics, Computer Science and Telecommunications.

Complete the work, we have compared the educational outcomes of the experience that is being described, with the results obtained in the same course for the same mixed group, during the preceding year under the traditional teaching method. Table 1

CONTEXT AND KEY CONCEPTS

Key concepts: co- assessment and allocation of roles

The considerations made in this document are based on alternative assessment methods proposed in several studies. (Sadler, 1989; Newman and Wehlage, 1993; Taras, 2002) Self-assessment and peer assessment take into account the assessment of students; however, with co- assessment the teacher shares the responsibility for assessment with the student.

The hallmark of co- assessment is the student's active participation in the task of assessment. Teacher and student clarify learning objectives and apply the rating criteria raised. Both are involved in a consensual manner, interacting to achieve the goal of issuing a shared assessment based on the initial reference (Somervell, 1993; Topping, 1998).

The process of co- assessment contributes to the development of skills and competencies, while at the same time guiding the student in the teacher's role, as co- assessment is a change of role in so far as the assessment process, which had traditionally been the sole responsibility of the teacher, is now shared (Hall, 1995). In this sense, there is a direct connection between both practical experience and theoretical foundation and the second concept under consideration, the allocation of roles.

In the innovative projects, it is necessary to define clearly the different profiles involved, the mission and the goals, the methodological strategies, the most appropriate materials and resources to carry out the project, and the new roles and relationships between all the project's participants (Fullan, 1982). In this regard, several studies point to a structured form of interaction among the students, which describes the role each should take and how it should be carried out. The effectiveness of such interactions has been demonstrated in certain cooperative practices, such as mentoring between students (AAVV, 1989; Melero Berrocal and Fernández, 1995).

In our experience, the distribution of roles, the detailed planning of tasks and deadlines are clearly specified by

[2] During the last few years the Bologna process has been going on in Europe: a process where ideas of comparability, mobility and transparency are put forward as a means to create a European educational space. This is a declaration signed by both members of the European Union and other countries and it isn't something the countries have to adapt to; it's voluntarily. Narratives about harmonization are in some aspects taken-for-granted and many universities in Europe have accepted this process and see it as inevitable (Nóvoa, 2002, Ahola & Mesikämmen, 2003).

Table 1. Describes in detail the context in which the research was conducted on a total of 65 students that participated.
Table 1. Context of research.

Course	Technological direction and Innovation 2010-2011	Technological direction and Innovation 2009-2010
ECTS	6	6
Type of course	Optional	Optional
Curse	Last year of each degree	Last year of each degree
Degree	Bachelor of Business Administration, Economics, Computer Science and Telecommunications	Bachelor of Business Administration, Economics, Computer Science and Telecommunications
Number of groups	1	1
Teaching Methodology	Bologna	Traditional
Students per group	33	32
Class hours a week	4	4

Source: author-compiled data.

the teacher early in the course. Therefore, the balance between group work and individual responsibility lies with the combination of steps performed individually and jointly, and the monitoring carried out by the teacher at the different stages of the work. A combination of forms of both, indirect support through working patterns, and direct support through the meetings with each group can be observed. Therefore, one can easily imagine different variations in the support provided by the teacher: using patterns that are more or less detailed, offering different suggestions to different groups, increasing or reducing the frequency of meetings with each group, introducing specific meetings and reviews of the process with all the group/class, and so on. These supports vary depending on the resourcefulness shown at all times by the students in developing the activity (Onrubia, 1997).

DESCRIPTION OF THE METHODOLOGY OF THE COURSE TAUGHT, ADAPTED TO BOLOGNA

Purpose

The project's main objective was to optimize methodological skills, attitudes and abilities of students through a system of cooperative learning, focused on promoting creativity and aligned with the skills and protocols required by the labour market and global society of today. The sharing of knowledge and enhancing of skills through assuming different roles of relational experiences, helped students to assimilate theoretical concepts more easily, as well as enabling them to significantly strengthen their development of certain skills through the project.

Schedule of Tasks

The course is broken down into five distinct stages. The first stage corresponds to the first week of the course, in which students learn in detail the dynamics of the course and the course schedule. In this week, the different working groups were also formed. The number of groups equals the number of thematic areas in which the teacher divides the course syllabus.

In the second stage, the teacher opens the course by providing an introductory module, which will alternate practical and theoretical activities that complement a lecture on the basics of the course in question. The third stage "Pre-season" is characterized as the preparatory time for the coordination segment (two sessions) to be carried out in the fourth stage. Thus each group, in addition to preparing its two coordination sessions, has to draft a statute which collects the basic rules of

coexistence in the daily group work. Furthermore, each group meeting must be recorded in a series of minutes describing the work which along with the statute should be delivered to the teacher to form part of the group assessment along with the two coordination sessions of the "official season". During the four-week "Pre-season" the teacher meets with each group and looks at how they have worked and advise them on the ideas that were put forward and the needs that came up, in an attempt to guide the group in the project coordination.

The fourth stage "official season" is dedicated to the presentation-coordination of each thematic block for each of the groups. Each group must coordinate two consecutive sessions (coordination stage), during which, they should act as " expert teams" and lead the class in theoretical presentations, individual activities, group work, games, debates, gymkhanas, etc.. While one group assumes the coordination role, the rest of the class behave as students. All students rotate at some point during the course to play the role of coordinator. The last stage is associated with the final stretch of the course and consists of several visits by experts in innovation who have innovative experience in the business world, as well as two sessions in which teachers and students derive the conclusion of the whole course as a way of closing the subject.

Assessment System

The assessment system used on the course is based on the following seven areas of competence explained below:

• Capacity planning and decision making.
• Cooperation and teamwork.
• Development of communication skills.
• Development of innovation and creativity.
• Assimilation of basic concepts.
• Analytical skills, assessment and constructive criticism.
• Assimilation, adaptation and compliance, deadlines and protocols.

All the basic skills of the course-assessment were measured qualitatively and quantitatively using the items on the rating scale system used by the teacher and students under the system of co- assessment described in this work and applied to the course covered by the project.

Here are the percentages of the assessment and rating of student-potential according to the assessment system and the dynamics of the course.

- Coordination Stage (Two sessions + draft + statutes + proceedings)→40%
- Student Stage (rest of the course)→30%
- Supplementary Block: self-assessments, work experience and participation→30%
-

Each party should be assessed at least a four out of ten in order to apply the previous assessment system. Below one can observe a more detailed description of the marking scheme for each part.

Coordination stage (40%). In turn this stage was divided into:

- *Assessment of the sessions (25%)*. This stage lasted for two sessions. Each student belonged to a coordinating group which would lead the class during two consecutive sessions. During these sessions, the group had to explain their subject matter and encourage the learning of students using various techniques and class activities. The following assessment of the sessions was obtained

  - 50%: The teacher assessed the sessions based on a scale of assessments.
  - 50% (also associated with student stage). This 50% was obtained from the average rating students gave to the coordinating groups.

- *Coordination Project* assessment *(10%)*. The project had to be submitted to the teacher.
- *Assessment of the group minutes and bylaws (5%)*. Each group had to write a document that specified the internal rules of engagement and interaction. It was also necessary to include in such statutes, any penalties and judgments on hypothetical problems arising from any violation of the provisions described in the statutes so as not to prejudice anyone. Flexibility was allowed in the development of these bylaws, which would then be adopted after acceptance by the teacher, during the first week of "pre-season".

Similarly, each coordinating group had to work using a system of records. From the start of pre-season up until the formal coordination meetings of each group (as scheduled), each time the groups met to work, they had to draft a written report describing aspects such as date, duration, participants , thematic contributions, conclusions, tasks for the next meeting. The set of records had to be submitted to the teacher one week before the first session of group coordination. The teacher could ask for the minutes at any time to see if they were really being kept up to date.

Student stage (30%). Stage-role for the student during the remaining period of the course. The obligations of the student were:

- 80% Assessment of "Student Role": Average rating of individual and collaborative work throughout the course (rated by coordinating groups, which assess and qualify, individual and group work of each student for its coordination segment).
- 20% Assessment of "Evaluator Role." At each stage of coordination, organized in groups, students evaluate and rate the coordinating group for that stage of coordination. One assessment mark was given to the whole group after having reached an internal consensus.

Additional block (30%) composed of:

- Self-Tests: Each test consisted of a series of standard questions relating to the subject matter.
- Complementary work: work related to the topic in question, and developed in the follow-up session. Could be case studies, debates, essays ... (Among which there were some cases linked to production and innovation strategy in the company).
- Participation: It played a primary role in the course.

DESCRIPTION OF THE TRADITIONAL METHODOLOGY USED

The traditional teaching methodology used was based on lectures and on an assessment system of continuous training. The assessment system was considerably simplified and had the following characteristics:

- Two objective multiple choice tests which accounted for 50% of the final grade in the course. The first one had a weighting in the final grade of 30% and the second 20%.
- The rest of the score, which accounted for the remaining 50%, consisted of other activities such as the following:

○ Individual assignments (one for each topic) (35%).
○ Case Study carried out individually at the end of the course and discussed in groups at the end of the activity (15%).

METHODOLOGY AND RESULTS

Methodology

While conducting this study, a quantitative descriptive methodology was used and for which descriptive statistics techniques have been used such as frequencies and means. The sample used was the number of students who have completed the courses. A survey was also carried out for students who completed the two methodologies whereby they could express their opinion.

Academic results: Bologna Methodology versus Traditional Methodology

Table 2 discusses the descriptive statistics of the two courses, with scores: 1-5: fail, 5-7: Pass/Second Class Lower Division, 7-9: Second Class Upper Division, 9-10: First Class.

The Tables 3 and 4 show the frequency distribution (percentage) of different grades in the two courses:

Results of student satisfaction with the methodology.

The activity developed was assessed by 14 students of the 26 that were enrolled on the Bologna method. They answered a satisfaction survey with nine items for personal assessment, related to the degree of development of certain abilities and overall assessment. The following items were specifically assessed: level of teamwork, analytical and problem solving, fostering creativity and innovation, level of technical knowledge, promoting and improving communication abilities, connection to the professional world, level of investment Time-effort-results, and level of basic knowledge.

The low participation of students is because the survey was carried out on the virtual platform Moodle[3]. Despite being anonymous, participation in these activities tends to decrease if the survey is not carried out in the classroom. In future issues, this is clearly an area for improvement.

For the analysis of results, we used descriptive statistical techniques. Once collected, the survey responses were organized and recorded on a spread sheet for later coding, tabulation and statistical analysis using the programme -Solutions Products and Services Statistics (SPSS) for analysis of results. The following tables show the results of the main descriptive statistics and frequency representation of the degree of student

[3] The name of the virtual platform used in most Spanish Universities.

Table 2. Descriptive statistics of the final scores.

Methodology	N	Min.	Max.	Average	Standard Deviation
Traditional academic results	27	2,71	9,76	**7,07**	1,589
Academic results Bologna	31	1,20	9,00	**5,89**	1,96814
Valid N (list wise)	26				

Source: author-compiled data.

Table 3. Frequency distribution of the course taught by the Traditional Method.

Scores	Percentage
Not submitted	18,8
Fail	6,3
Pass/Second Class Lower Division	31,3
Second Class Upper Division	34,4
First Class	9,4
Total	100,0

Source: author-compiled data.

Table 4. Frequency distribution of the course taught by the Bologna Method.

Scores	Percentage
Not submitted	6,1
Fail	18,2
Pass/Second Class Lower Division	45,5
Second Class Upper Division	24,2
First Class	6,1
Total	100,0

Source: author-compiled data.

satisfaction with the course tailored to the Bologna methodology.

Tables 5 & 6 presents the results of the assessment that students have given on their satisfaction with the development of abilities that they have been working on the course. For the assessment of the satisfaction the Likert scale was used, which values the different items on a scale of 1-5 (where 1: not at all satisfied, 2: reasonably satisfied, 3: satisfied, 4: very satisfied, 5: totally satisfied).

In Table 7 & 8, students rated their satisfaction with the teaching-learning method on the Bologna based course versus traditional teaching. Therefore, they were asked in which method they believed they had learned more, with the following results:

Finally, we asked students about positive and negative aspects of the course methodology adapted to Bologna. Table 9 shows the findings of the students regarding this question:

One can observe a number of contradictory opinions: they welcome the activities of innovation, creativity, work experience, but negatively evaluate the assessment method, the difficulty of managing teamwork, etc. These conflicting views are not unique to this work and other studies that have asked students their views on the implications of Bologna have often produced conflicting results (Del Rincón and González, 2010).This is typical

Table 5. Descriptive statistics

Items	N	Min.	Max.	Average	Typical Deviation
Teamwork	14	2	5	4,57	0,852
Troubleshooting	14	3	5	3,79	0,699
Creativity	14	3	5	4,57	0,6462
Technical knowledge	14	2	5	3,64	0,929
Communication abilities	14	3	5	4,36	0,745
Professional approach to the world	14	2	5	3,64	0,929
Time / effort / results	14	1	5	3,64	1,082
Basic Knowledge	14	3	5	3,71	0,726
Global satisfaction	14	2	5	**4,00**	0,877

Source: author-compiled data.

Table 6. presents the frequencies of the degree of satisfaction for each item rated:
Table 6. Frequencies (%).

Likert scale rating	1	2	3	4	5
Teamwork	--	7,1	--	21,4	**71,4**
Troubleshooting	--	--	35,7	50	14,3
Creativity	--	--	7,1	28,6	**64,3**
Technical knowledge	--	**14,3**	**21,4**	50	14,3
Communication abilities	--	--	14,3	35,7	**50**
Professional approach to the world	--	7,1	42,9	28,6	21,4
Time / effort / results	--	7,1	35,7	35,7	21,4
Basic Knowledge	--		42,9	42,9	14,3
Global satisfaction	--	7,1	14,3	**50**	**28,6**

Source: author-compiled data.

Table 7. Learning and teaching methods.

Methodology	Frequency (%)
Traditional	21,4
Bologna	35,7
No difference	**42,9**
Total	100,0

Source: author-compiled data.

Table 8: Preference of students for teaching method.

Teaching Method	Frequency (%)
Traditional	28,6
Bologna	**71,4**
Total	100,0

Source: author-compiled data.

Table 9. Strengths and weaknesses of the methodology used.

Strengths	Weaknesses
Teamwork.	Unfair assessment method.
It is original and can boost abilities.	How to assess the group members.
Teamwork and getting to meet new colleagues.	By having students explaining you learn less.
The interaction and putting theory into practice.	--
The assessment system is very educational.	--
The self-learning.	The assessment method is too complex.
The assessment system.	The ways that some groups assessed and the marks they gave.
Doing some interesting topics such as strategic management.	--
Entertaining and useful.	Individual assessment of the groups.
Additional topics provided by the teacher	The inability to customize and self-manage more what I learn (look more deeply into what interests me more)
The most practical course and different, more focused on work.	--
Innovation when looking for original games in each group.	Some subjects were too boring.
Creativity when planning the sessions.	Not being able to form the groups ourselves making it sometimes difficult to meet up.
The different way of giving the course.	Some points were not well understood when explained by the students.

Source: author-compiled data.

and similar to a novel system that must be gradually improved.

METHODOLOGY AND RESULTS

As regards the comparison between the academic performance of the two courses taught each using a different teaching method, Traditional versus Bologna, one can conclude that the average of all final grades obtained by students decreases if we apply the Bologna method of education (from 7.07 to 5.89). This data is complemented by another observation from the results of the study: a significant decrease of 10 percentage points in the number of Second Class Division One results using the Bologna method. We should add that the failure rate of the course (not submitted and fail), remains constant (around 25%), and therefore about 75% get through the course, under of both methods, which makes the data presented more reliable. The brightest students have fallen by an average of 35% under the Bologna method as well as Second Class Division One alumni which has declined (34.4% with the traditional method down to 24.2% under the Bologna methodology). The justification for this downward trend in First and Second Class degree results could be explained because in the collaborative activity, the mark is given to a team and may affect negatively the final mark the best students.

As mentioned in the preceding paragraph, the failure rate of the course remains constant in both methods, with student absenteeism being reduced under the Bologna methodology, from 18 per cent to 6 per cent. From here you can draw a clear conclusion, which also coincides with one of the Bologna goals: increasing student class attendance and their participation in organized activities, with varying degrees of success, "At least they try ". In addition, one can conclude from the previous paragraph that the percentage of students that passed (score between 5 and 7) increases with the application of the Bologna method (from 31.3% to 45.5%), due to the

considerable drop in First Class ratings under its implementation (from 43.8% to 30.3%). So you can observe that students who manage to pass the course, are more likely to get better grades under the traditional system than under with the Bologna method, where it seems to be more difficult to achieve excellent ratings.

Finally, we have highlighted a number of conclusions from the satisfaction survey carried out on students in order to assess their opinions and ratings associated to the method of collaborative learning. The surveys show that:

- The best rated objectives of the course by students as regards the degree of compliance with the objectives posed at the beginning of the course were: learning to foster teamwork and creativity, with a rating of 4.57 out of 5, and the development of communication abilities with 4.36 out of 5.
- Acquisition of expertise, and investment effort-time/results obtained with 3.64 out of 5, still above average.
- Overall satisfaction with the methodology used was very positive with 4 out of 5.
- 71.4 per cent of students were very satisfied with the competency development of teamwork and 64 per cent with their creative development during the course.
- 50 per cent of the students were quite satisfied with the methodology used.

As for the preference of students who know and have studied both the learning methodologies, Traditional and Bologna, 71.4 per cent prefer Bologna, and 35 per cent of them state that they learn more with this methodology. As can be seen, the average academic outcome is worse in the course when taught using the Bologna methodology. However, the benefit of skills development in students is not produced in the traditional method. Bologna, therefore, adds value to student-learning but this is not necessarily reflected in academic results. There is a hypothetical justification for this, since students who have participated in this project are used to the traditional methodology and therefore lack solid and efficient training in skills throughout the first years of the degree. For this reason, we propose as a future line of research, the development of this project in groups that are only native to the Bologna methodology.

Other conclusions arising from this experience, some of which are subject to improvement for in future versions of the paper, are:

- The need for greater intervention by the teacher at the end the coordination segment to enhance the technical knowledge of the program to.
- Co- assessment should be carried out through a meeting with the teacher and each assessment group rather than assessed separately.
- This experience can be adapted to any field of education and any course in the programs of the "Bologna Process".

In summary, this study shows that although the data on academic performance is better in the traditional method, Bologna reduces absenteeism in the classroom and adds value to education through the development of skills competence. This makes students value the method positively and even higher than the traditional method, despite accepting that there is a relative deterioration in their academic achievements. The Bologna methodology assesses other aspects that traditional methodology overlooks and for this reason, the assessment of students is more complete and sometimes more complex because not only are technical knowledge and skills valued but also the development of skills and talents. Specifically, the proposed methodology of collaborative learning and teaching experience within the scope of Bologna meant that students have felt very much satisfied with the activity and the development of skills such as teamwork, creativity and communication skills. There are areas for improvement in the activity, but it certainly has positive impact.

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