NEW TEACHING METHODOLOGIES TO BOOST THE INTERDISCIPLINARITY IN HIGHER EDUCATION

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INTERDISCIPLINARY TEACHING EXPERIENCE INNOVATION IN UNIVERSITY

“INTEGRATION OF THE DIFFERENT DISCIPLINES AND SKILLS TO ADDRESS THE PROCESS OF ECONOMIC PROBLEMS SOLUTION”

This experience is included into a funded teaching innovation project in the program of consolidation of the European Higher Education Area (EHEA) of the UEx.
Outlines

♣ Motivation
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♣ The activity
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Motivation

The so-called Bologna Process implies the possibility of improving the integral education of students by the encouragement of teaching actions leading the development of competencies that enable them to enjoy better job opportunities.

The acquisition of competencies requires the introduction of new teaching methodologies focused on active student learning.

On the other hand, it is needed to encourage the interconnection between subjects in order to improve the education of the students.
Motivation

Main objective:

To analyse the influence that on the development of students’ competencies has been the implementation in the classroom of an innovative teaching methodology that stimulates interdisciplinarity among different subjects

Main results:

The activity developed has been positively valued by students and has had a positive impact on the development of cross competencies
Objectives

✓ To use innovative methodologies through teachers’ collaboration and planning activities among various subjects
✓ To encourage the development of a series of cross competencies particularly relevant for a graduate in Economics and Business Administration

COMPETENCIES:

Ability to work in team
Analysis and Synthesis Ability
Oral and Written Communication in native Language.
Problem Solving Ability
Computer skills related to field of study
Development of interpersonal skills
**Interdisciplinary Cooperative Learning**

**Cooperative learning (CL)** is based on the participative built knowledge, and it gathers different methodologies: from specific classroom techniques to the teaching frameworks or conceptual approaches.

**Definition:** A process that emphasizes cooperative learning and efforts in a group to achieve specific tasks.

CL is **characterised** by the group’s size, its composition, goals, roles, way of working, rules and social skills which create, keep and improve the group.
Interdisciplinary Cooperative Learning

CL can be a very effective way of handling the class in order to develop social skills, to get a better command of concepts, to improve the ability of solving problems, and to get better communicational and linguistic skills.

**CL POSITIVE ASPECTS: ACADEMIC LEVEL**
- Improves performance and productivity
- Improves the quality of learning strategies
- Allows to develop strategies for processing information
- Encourages critical and constructive thinking
- Improves the capacity of communication and expression
- Gives the student more responsibility and power of learning
Interdisciplinary Cooperative Learning

**AFFECTIVE LEVEL:**
- Influences on motivation through improving the learning techniques
- Changes the sense of failure because it is the result not of individual but the group
- Improves self-esteem and self-concept

**SOCIAL LEVEL:**
- Allows the acquisition of social skills: group members learn to hold a conversation, ask for help, explain, criticize ...
- Social interaction allows the acquisition of conversational skills as listen, give argue, taking turns, etc.
Interdisciplinary Cooperative Learning

CL is, for this reasons, a methodology supported by excellent results with respect to the integral education of the students.

If, moreover, who performs teaching is an interdisciplinary team, as is our case, this practice is highly enriching.

According to these features, we have called our experience: INTERDISCIPLINARY COOPERATIVE LEARNING (ICL)
Context

· **Institution:**

Faculty of Business and Economics Sciences. University of Extremadura

· **Degrees:**

Economics & Administration and Management Business Economics

· **Subjects:**

Microeconomics, Macroeconomics, Statistics & Mathematics (1th course/2th semester).
Preparation of the activity

LEARNING ACTIVITY:

Resolution by students of 4 problems that reflect real economic situations

The problems involve Microeconomics concepts (consumer equilibrium, elasticity and market equilibrium) and Macroeconomics concepts (general price index, GDP deflator, nominal and real GDP, growth rate and inflation rate) with the needed use of mathematical and statistical tools (mathematical optimization, index numbers, calculation of growth rates and probabilityes)

3 TEACHING INNOVATIONS:

INTERDISCIPLINAR

INTERDISCIPLINARY LEARNING.

COOPERATIVE LEARNING TECHNIQUES

RUBRICS FOR COMPETENCIES ASSESSMENT

COOPERATIVE LEARNING (ICL)
The activity

Jigsaw classroom strategy

The jigsaw classroom was first used in 1971 in Austin, Texas. Professor Aronson designed the jigsaw strategy as a matter of absolute necessity to help defuse an explosive situation. The city's schools had recently been desegregated, and because Austin had always been racially segregated, white youngsters, African-American youngsters, and Hispanic youngsters found themselves in the same classrooms for the first time.

The jigsaw classroom is a CL learning technique that successfully achieve to reduce racial conflict and to increase positive educational outcomes. Just as in a jigsaw puzzle, each piece--each student's part--is essential for the completion and full understanding of the final product. If each student's part is essential, then each student is essential; and that is precisely what makes this strategy so effective.
The methodology that we used was the following:

- Students were divided in groups of six members trying to maximize the heterogeneity ("base groups")

- Then, class work was divided by the number of members and every student received a part of it

- Next, students with the same piece of work were gathered in "expertise groups" where the problems were solved and debated

- Finally, every student returned to their original group ("base group") and showed to the remainder what he or she had learned
The activity

4 Steps:

1. Base groups formation
2. Work organization and distribution
3. Working in expertise groups
4. Working in base groups
5. Assessment of the achieved learning and the effectiveness of the technique
1st STEP: BASE GROUPS FORMATION

- The class is divided into groups of 4 students (base groups)
- 62 students in total were presented
In each of the based groups is attempting to maximize diversity.

Approx. time: 15 minutes
2nd STEP: Work organization and distribution

- Teachers delivered 4 economic problems to each team, which constitute the activity

- Each based group appoints an "expert" in each of the given problems

- Every "expert" takes a problem (of 4) that should work

- Students prepared their tasks individually trying to understand and analyse how they could address the problem

Approx. time: 10 minutes
3thd STEP: Working in Expert groups

- Students leave their based group and work in their expert group on each of issues that has divided the total activity.

- Each expert group consists of 4/6 students and its mission is to discuss and resolve the issue that should work.

Approx. time: 45 minutes
4th STEP: Working in based groups

- The students return to their base groups with their problem resolution held in the expert groups.

- Each student tells the rest what he/she has learned and how the expert group has solved the problem assigned. Meanwhile, the other fellow asks and makes questions and considerations.

- Finally, each based group written and presented to the teacher the resolution of the 4-economic problems that is assessed by the teachers according to the dimensions and criteria of evaluation rubric.

Approx. time: 60 minutes
5th STEP: Assessment of the achieved learning and the effectiveness of the technique

- Individual performance assessment through a small multiple choice test was conducted

- Finally, to assess the effectiveness of the technique, a questionnaire was passed at the end to apply for the students’ opinion

- The questionnaire covered the dimensions that include this activity and in which was also requested to assess peers (peer assessment)

*Approx. time: 40 minutes*
<table>
<thead>
<tr>
<th>PROBLEM UNDERSTANDING (10%)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>The base group identifies clearly the relevant information of the problem: initial data, variables to resolve, conditions that have to be into account and the final objective of the problem. He is be able to establish a relationship between all variables.</td>
<td>10 points</td>
<td>7 points</td>
<td>4 points</td>
<td>0 points</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEVELOPMENT OF SOLUTION (40%)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>The base group uses the most appropriate mathematical technique for solving the problem. It does so in a clear and orderly. It reaches the correct final solution in all parts of the problem.</td>
<td>40 points</td>
<td>28 points</td>
<td>16 points</td>
<td>0 points</td>
</tr>
<tr>
<td>The base group uses the most appropriate mathematical technique for solving the problem. It does so in a clear and orderly. Although not explain some steps, it reaches the correct final solution in at least 70% of all of the problem.</td>
<td>40 points</td>
<td>28 points</td>
<td>16 points</td>
<td>0 points</td>
</tr>
</tbody>
</table>
**EDULEARN 2014 : 6th International Conference on Education and New Learning Technologies**

### Rubric assessment

<table>
<thead>
<tr>
<th></th>
<th>A (100 points)</th>
<th>B (70 points)</th>
<th>C (40 points)</th>
<th>D (0 points)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USE OF IT TOOLS (20%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The base group correctly uses statistical tools of Excel all calculations.</td>
<td></td>
<td></td>
<td></td>
<td>The base group uses incorrectly tools Excel.</td>
</tr>
<tr>
<td><strong>20 points</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>INTERPRETATION AND CHECKING RESULTS (30%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The base group can interpret the solution and presents the final conclusion clearly.</td>
<td></td>
<td></td>
<td>The base group can interpret the solution that offers and he presents the final conclusion clearly.</td>
<td>The student does not interpret the obtained solution or does it incorrectly.</td>
</tr>
<tr>
<td>It justifies and frames his conclusions in the economic and sociological theories given in classes.</td>
<td></td>
<td></td>
<td>It justifies and frames his conclusions in the economic and sociological theories given in classes.</td>
<td></td>
</tr>
<tr>
<td>The base group checks that the solution obtained is feasible by inspecting the starting conditions and the proposed objective.</td>
<td></td>
<td>The base group checks that the solution obtained is feasible by inspecting the starting conditions and the proposed objective.</td>
<td>The base group doesn’t check that the solution obtained is feasible by inspecting the starting conditions and the proposed objective.</td>
<td></td>
</tr>
<tr>
<td><strong>30 points</strong></td>
<td></td>
<td><strong>21 points</strong></td>
<td><strong>12 points</strong></td>
<td></td>
</tr>
</tbody>
</table>

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**ALL SCORES OBTAINED ARE BETWEEN 0.65 to 0.85 (1 point maximum)**
Results: Development of students’ cross competencies

Students’ perception averages: Development of students’ cross competencies by the application of the ICL methodology

1st result: ICL methodology favourably contributes to the overall education of students and the development of the required competencies

- Computer skills: 3.62
- Interpersonal skills: 3.82
- Solving problems skills: 3.77
- Oral & written communication skills: 3.82
- Analysis & synthesis skills: 3.0
- Working in an interdisciplinary team skills: 3.97
Results: Students’s perception of the ICL methodology

### Students’ perception averages

<table>
<thead>
<tr>
<th>Perception</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfort</td>
<td>4,3</td>
</tr>
<tr>
<td>Motivation (individual work)</td>
<td>4,2</td>
</tr>
<tr>
<td>Improving self esteem</td>
<td>3,35</td>
</tr>
<tr>
<td>Improving interpersonal relations</td>
<td>3,92</td>
</tr>
<tr>
<td>Integration with other colleagues</td>
<td>4,2</td>
</tr>
<tr>
<td>Greater responsibility</td>
<td>4,2</td>
</tr>
<tr>
<td>Interdisciplinarity among subjects</td>
<td>3,59</td>
</tr>
<tr>
<td>Positive for the learning process</td>
<td>4,1</td>
</tr>
</tbody>
</table>

**2nd result:** we conclude the positive assessment of the realization of ICL methodology in the classroom.
Conclusions

We conclude that ICL methodology is positive and relevant in two aspects:

- The ICL methodology not only allow improving the students’ learning in contents but also in developing competencies

- The interconnection between subjects allowed students to adjust their learning to a more comprehensive understanding

The ICL methodology for the development of competencies is likely to be used in other degrees and with other subjects
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Thanks a lot for your interest!!