



@tic. revista d'innovació educativa  
ISSN: 1989-3477  
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Universitat de València  
Espanya

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@tic. revista d'innovació educativa, núm. 17, 2016

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**Disponible en:** <http://www.redalyc.org/articulo.oa?id=349551247009>

# An application of the case study in the Zaragoza University Masters' Teacher Training

La aplicación del estudio de caso en el Máster en Profesorado de la Universidad de Zaragoza

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**Resumen:** Los cambios metodológicos propuestos por el Espacio Europeo de Educación Superior (EEES) han propiciado la aplicación del método del estudio de caso en distintas enseñanzas. En este estudio se analiza la aplicación del método del caso en el Máster en Profesorado de la Universidad de Zaragoza. Este estudio se ha aplicado en dos grupos de estudiantes de distintas especialidades (Ciencias Naturales y Ciencias Experimentales) de la asignatura de Interacción y convivencia en el aula, formando una muestra conjunta de 98 estudiantes ( $N=98$ ). Con el fin de analizar los resultados de aprendizaje obtenidos a través del método del caso y de la asignatura, se ha comprobado si existe una relación entre los aprendizajes adquiridos a través de la resolución del caso y el aprendizaje global de la asignatura. Los resultados muestran la existencia de una correlación positiva moderada significativa entre ambos tipos de aprendizaje ( $p<.001$ ), observando una correlación mayor en la especialidad de Ciencias Naturales en comparación con la de Ciencias Experimentales. Estos resultados muestran la utilidad del método del estudio de caso para mejorar el proceso de enseñanza-aprendizaje en las instituciones de educación superior y la importancia del uso de esta metodología por parte del profesorado, que podría promover la adquisición de competencias transversales, tales como la creatividad, el pensamiento crítico y metacognitivo en la resolución de problemas. Las implicaciones de este trabajo apuestan por el diseño de diferentes tipos de actividades en las que se aplica el método del caso y su impacto en el aprendizaje.

**Palabras clave:** Educación Superior, estudio de caso, Espacio Europeo de Educación Superior, métodos de aprendizaje activo, resolución de problemas.

**Resum:** Els canvis metodològics proposats per l'Espai Europeu d'Educació Superior (EEES) han propiciat l'aplicació del mètode de l'estudi de cas en distintes ensenyances. En este estudi s'analitza l'aplicació del mètode de cas en el Màster en Professorat de l'Universitat de Saragossa. Este estudi s'ha aplicat en dos grups d'estudiants de distintes especialitats (Ciències Naturals i Ciències Experimentals) de l'assignatura d'Interacció i convivència en l'aula, formant una mostra conjunta de 98 estudiants ( $N=98$ ). En la finalitat d'analitzar els resultats d'aprenentatge obtinguts a través del mètode de cas i de l'assignatura, s'ha comprovat si existix una relació entre els aprenentatges adquirits a través de la resolució del cas i l'aprenentatge global de l'assignatura. Els resultats mostren l'existència d'una correlació positiva moderadament significativa entre els dos tipus d'aprenentatge ( $p<.001$ ), observant una correlació major en l'especialitat de Ciències Naturals en comparació a la de Ciències Experimentals. Aquests resultats mostren l'utilitat del mètode de l'estudi de cas per a millorar el procés d'ensenyança-aprenentatge en les institucions d'educació superior i l'importància de l'ús d'aquesta metodologia per part del professorat, que podria promoure l'adquisició de competències transversals, tals com la creativitat, el pensament crític i metacognitiu en la resolució de problemes. Les implicacions d'aquest treball aposten pel disseny de diferents tipus d'activitats en les quals s'aplica el mètode del cas i el seu impacte en l'aprenentatge.

**Paraules clau:** Educació Superior, estudi de cas, Espai Europeu d'Educació Superior, mètodes d'aprenentatge actiu, resolució de problemes.

**Abstract:** This study is based on the implementation and application of the case study method in Higher Education teaching (University Master's in Teacher Training) by

@tic. revista d'innovació educativa, núm. 17, 2016

Universitat de València, España

Recepción: 05/12/2016  
Aprobación: 09/12/2016  
Publicación: 23/12/2016

Redalyc: <http://www.redalyc.org/articulo.oa?id=349551247009>

the use of case study propitiated by the methodological changes from the European Higher Education Area (EHEA). This study has been applied in two groups of students of different specialties (Natural Sciences and Experimental Sciences) of the subject of Interaction and coexistence in the classroom, forming a joint sample of 98 students ( $N = 98$ ). In order to analyze the learning outcomes obtained through the case method and the subject, it has been proved if there is a relation between the acquired learning through the resolution of the case and the overall learning of the subject. The results show the existence of a positive and a moderate significant correlation between both types of learning ( $p < .001$ ), observing a greater correlation in the specialty of Natural Sciences in comparison with Experimental Sciences. These results show the usefulness of the case study method to improve the teaching-learning process in institutions of higher education and the importance of the use of this methodology by teachers, which could promote the acquisition of transversal competences, such as creativity, critical and metacognitive thinking skills in problem solving. The implications of this work serve to design different types of activities in which the case study method and its impact on learning are applied.

**Keywords:** Higher education, case study, European Higher Education Area, active learning methods, problem solving.

## 1. Introduction

The European Higher Education Area (EHEA) requires a change in teaching methods and in the role of students and teachers and focuses on the use of active methodologies. These active methodologies will be applied in the classroom in order to achieve the acquisition of generic or transversal skills by students (i.e. skills appropriate for the labour market and real life). In this context, it has been opted for the case study method as it is a methodology that fits in with educational principles required in this situation. Following this question, others authors pointed out school failure as a psycho-educative problem, and they have proposed to reconceptualise the at-risk students in terms of the relations that are established between different groups and the usual schooling conditions (Terigi, 2009).

The case study method can help develop the transversal skills designed for the European Higher Education Area (EHEA). According to Villa and Poblete (2007) the case study method can develop, among others, the following skills: analytical thinking, systematic thinking, creative thinking, reflective thinking, logical thinking, analogical thinking, practical thinking, deliberative thinking, problem solving, team thinking, decision making and ethical thinking. These competencies are integrated into the instrumental, personal and systemic competencies defined by the National Agency for Quality Assessment (ANECA) to develop qualifications based on the Tuning Project (González & Wagenaar, 2003).

According to Donoso-Vázquez (2014) two institutions have been fundamental to the dissemination of the case study method in Europe: the European Foundation Management Development (EFMD) and the European Case Clearing House (ECCH) as well as universities such as Maastrich (Holland) and Aalborg (Denmark), which uses this method in all the areas they teach. The case study has been defined as “the study of the particularity and complexity of a single case, coming to understand

its activity within important circumstances” (Stake, 2005, p. 11). This method descriptively collects different types of qualitative information, which are not reflected in numbers but rather in words. The essence of this methodology is to “highlight key incidents in descriptive terms” (Cebreiro & Fernández, 2004, p. 666). A case has been defined by Christensen and Hansen (1987) as

A case is a partial, historical, clinical study of a situation which has confronted a practicing administrator or managerial group. Presented in narrative form to encourage student involvement, it provides data— substantive and process— essential to an analysis of a specific situation, for the framing of alternative action programs, and for their implementation recognizing the complexity and ambiguity of the practical world (p. 27).

The wide variety of cases and case methods in teacher education programs today calls into question the presumed purposes that cases serve. Attending this question, Merseth (1996) provide an examination of case use and describe four “communities of practice” in which cases are found. In the first, cases appear as “instances of theory”; in the second, cases are used as “problems for deliberate and reflective action”; in the third relies on narrative forms of knowing, and in the fourth describes the mode of reasoning developed through the consideration of multiple cases. Furthermore and following these approaches, she divides the case purpose and use into three categories: cases as exemplars, cases as opportunities to practice analysis and contemplate action and cases as stimulants to personal reflection. Here it is highlighted the uses of the practical knowledge and how the knowledge is held by the use of cases.

Following the idea of case study helps to personal refection and how the knowledge is held using case method, De Miguel (2006) points out that this method allows us to analyse a complete event, fact or issue in order to find out about it in detail, interpret it, solve it, generate hypotheses, compare data, reflect, complete knowledge, diagnose a problem. Furthermore, this method train in the use of possible alternative problem solving procedures based on the general method of problem solving (de los Reyes, 2015), which is study the symptoms and the causes of a problem and find out solutions.

Regardless of the type of case study for which is chosen De Miguel (2006) distinguishes three stages in its development: 1) Presentation and initial familiarization with the theme; 2) Analysis of the case, tasks that can be performed in small groups or in large group sessions and; 3) Preparation of conclusions and recommendations cooperatively. Furthermore, Merseth (1996) remarks three essential elements of cases: they are real; they rely on careful research and study; and they provide data for consideration and discussion by users. These three elements are essential for developing an active and innovative learning.

The active learning strategies provided in Teacher Training are based on a methodology suitable to fill the gaps inherent on the theoretical classes and to help the effectiveness of the students learning. The case study method can achieve these goals as it is an active learning method engaged in solving problems. In addition, this methodology could

promote the development of creative (lateral and divergent thinking processes), critical (vertical and convergent thinking processes) and metacognitive thinking skills involved in higher order thinking skills and open solving problems (Larraz, 2011).

Master's in Teacher Training has a professional orientation and is a required qualification for teachers for compulsory and upper secondary education and vocational training. Access to the various teaching specializations of the master's degree depends on the qualifications needed to join the different teaching bodies. In Spain and in the most of the European countries, the continued lack of a pedagogical initial teacher training, integrated in each one's degree course has led to a professional identity discipline inadequate for attending the compulsory education (Bolívar, 2007). Furthermore, historically, the qualification of secondary school teachers had in common the divorce between theory and practice (Martínez, 2004). The teacher training in educational psychology of this stage has been limited (Moreno, 2006), presenting significant cleavages between disciplines and its contextualization as well as the weighting of instructional and educational processes. Therefore, it was considered that the training offer has been insufficiently sensitive to the needs of teachers (Furlong, 2008).

Therefore, if the use of the case study in the classroom by teachers is promoted, it will likely allow the possibility of a more realistic educational effort which is better suited to the real circumstances of the context. Thus, if useful strategies is transmitted to this end, a more effective teaching will be trained and a more significant type of learning for adolescent students will be achieved. As set out above, the present study has the following objectives:

- To provide meaningful learning in teacher primary school training students through the use of case studies in order to achieve a greater identification in their teaching practice with the real context to be found in schools.
- Achieve a better link between theory and practice through exposure to real cases that are analyzed together in the classroom in order to find the best possible solutions.

## 2. Method

This study uses a quantitative and a qualitative methodology. The quantitative analysis required the gathering of data related to students' grades and the qualitative one the extracting data from the recordings of students' opinions related to their satisfaction with the method applied. The case design made was based on the case method by de los Reyes (2015), in which a series of interpersonal situations were presented in order to be solved by the students. They had to solve them working in small groups and which were set out to a large group during two classroom sessions. Finally, an assessment of the outcome of the case was made in a virtual session. The results were evaluated based on the scores obtained in

the resolved cases. In addition, an assessment of students' verbal responses regarding their level of satisfaction with the proposed methodology was carried out.

### *2.1. Participants*

This study was carried out on the Master's in Teaching Training in Secondary Education and Upper Secondary Education, Vocational Training, Language, Arts and Sports in the Education Faculty of the University of Zaragoza (Spain). This Master's degree has 18 specializations organized into six groups of teaching, and is set to 60 ECTS credits and is taught in one academic year. The sample came from two groups of students with different specializations taking the Interaction and connivance in classroom course. According to UNESCO (2011) science classification, the specializations of the two teaching groups selected were Natural Sciences (Group 1) made up of 55 students (n=55) and Experimental Sciences (Group 2), made up of 48 students (n=48). In the first group prevail the students related to Natural Sciences, e.g. biology and environmental sciences, chemical and physical sciences. In the Group 2 predominates student related to Experimental Sciences, e.g. mathematics, engineering and technology and computing. Together these made up a joint sample of 98 students (N= 98).

### *2.2. Instruments*

The following instruments were used to assess the case study and its effects on student learning. There were used two assessment methods according to the resolution of the case by the students and the teacher approach.

The students have to assess their performance on the resolution of the case study during the process, and they used to evaluation scales: an individual evaluation of the resolution of the case study, and a team auto-evaluation of the resolution of the case study according to a score from 0 to 10 (0 represents the lowest score and 10 the best score). Also, the case study method was assessed by the teacher according to the following criteria:

1. Structure of the activity (60%): consistency and clarity of the different sections, clarity and appropriateness of the objectives, arguments and relationship of the concepts, conciseness and simplicity, appropriate terminology, implementation and justification of the proposal and literature cited and consulted.
2. Originality of the work (20%): number of ideas and activities contributed new proposals, originality and variety and quality of the proposals (planning, preparation and details).
3. Participation and integration of the team (10%): participation and cohesion of the team members.
4. Formal presentation and the final product (10%): formal presentation of the final product, delivery deadlines.



The score for this activity was included in the final grade for the course, counting for 40% of the final grade, out of a maximum of 10 points. Furthermore, a non-systematic observational recording of the students' answers was carried out at the end of the study in order to evaluate their level of satisfaction through the case study and to collect their perceptions regarding future improvements.

### 2.3. Procedure

The study was conducted in twelve classroom sessions including the presentation of the case, the resolution of the case and the evaluation of the case. These sessions focused primarily on presenting different case study related to psychological development in primary school years.

The activities used were based on setting out the case study in the classroom. Students had to make proposals and solve the case through the theoretical premises of the cases according to physical, cognitive, emotional or social development.

The case study was conducted through collaborative work. The solution of the case depended on the approach of each team, their specialities in knowledge from the components of the group, the tools and the techniques and the instruments of tutoring they used. To evaluate the solution of the case, feedback was provided to the whole group in a second classroom session. In addition, a virtual assessment of the outcome of the case was conducted through an online platform (Moodle) by means of a weighted scale which covered the issues in the tutorial intervention.

The application of the case study was staged through onsite activities (face-to-face sessions) in the following way:

a) Face-to-face session: Presentation of the proposed activity through cooperative work groups in the classroom. Provision of bibliographical material and consultations through the different devices provided. Discussion in small groups and collaborative work, presentation of answers proposed for each case in a large group. Final debate and reflection on the proposals.

b) Evaluation session: Group feedback at the end of the face-to-face session and verbal virtual feedback through the Moodle platform. Students had to upload the activities of their teams to the Moodle platform in an activity specifically designed for this purpose.

## 3. Results

In order to compare and assess the learning results obtained through the case study method, an analysis was carried out to observe whether the case study grades and those of the regular course were related. To find out this question, there was made a correlation between the learning acquired through the case study method and the global learning of the course.

To this purpose a linear correlation analysis was carried out by obtaining the linear Pearson correlation coefficient. A score of 0.561

(0.56) was obtained, which suggests the existence of a moderate positive relationship between scores on the overall evaluation of the course, and the scores on the outcome of the case study. Furthermore, this relationship is significant, with a probability of error of less than .001 ( $p < .001$ ) and a confidence level of 99% ( $N = 0.99$ ). Partial Pearson correlations also have shown that there is a significant correlation between both scores the special field of knowledge and the group selected (see Figure 1).

Variables	Pearson Correlation	Sig. (bilateral)
Case Study – Global subject score	.56(**)	.001
Case Study- Global evaluation. Control: Special Field	.55 (**)	.001
Case Study- Global evaluation. Control: Groups	.45 (**)	.001

Figure 1.

*Correlations between points awarded in the case study evaluation and the course evaluation*

Source: Own elaboration. \*\* The correlation significant at the 1%(bilateral)

To deepen the analysis, it has been studied whether the student's specialization degree of this study has any impact on the obtained results. Regarding groups specified, the Person correlation has shown important differences between the participant's scores. So for the Group 1 a strong correlation ( $r_{xy} = 0.63$ ) as for all sample can be appreciate. However, the opposite results have been obtained for the Group 2 (Figure 1). The Pearson correlation ( $r_{xy} = 0.25$ ) and with significant at the 10% level, has shown weak relationships between "Case study" score and "Global course" score evaluations. In the first group prevail the students related to Natural Sciences fields (e.g. chemical, physical and environmental sciences). In the Group 2 predominate student related to Experimental Sciences (e.g. mathematics, engineering and architecture). Figure 2 shows the scatter plot of the data obtained and the linear relationship between the data obtained from the ratings shown.



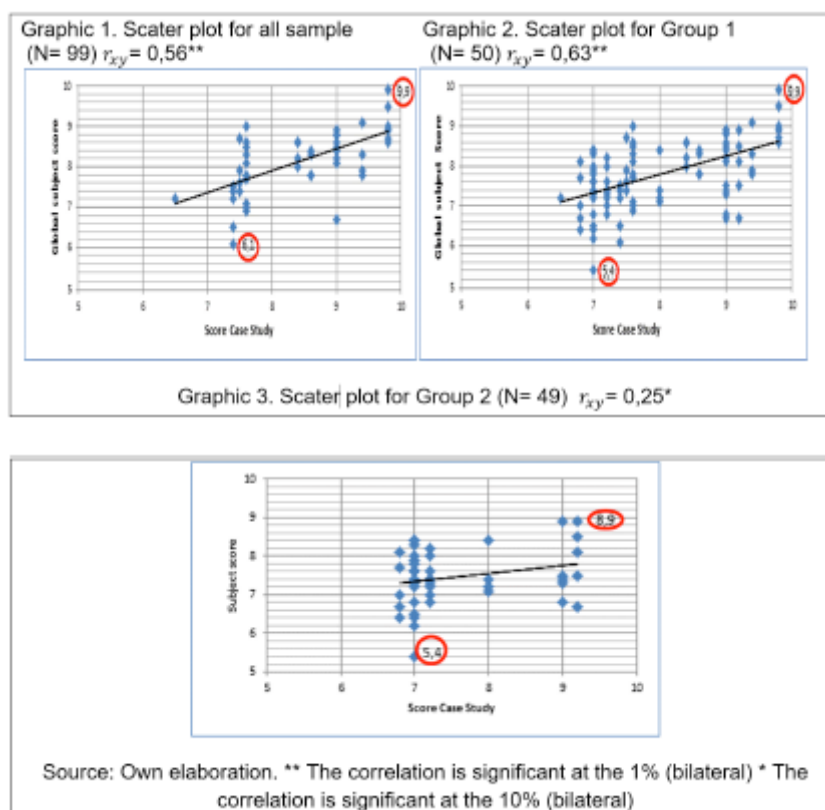


Figure 2  
Scatter plots and coefficient correlation as groups in the study

## 4. Discussion

This study reveals the effectiveness of learning acquired through the case study method as it involves practicing an innovative method for teaching and learning and an approximation to the problems of the real life in the schools. This is seen in the written evaluations of students after the end of their course and in the significant correlation founded between the scores obtained on the overall evaluation of the course, and the scores obtained on the outcome of the case study.

This case study methodology is valued positively by students as a tool for meaningful learning, both in qualitative and quantitative terms, a significant moderate positive correlation has been obtained between the “Global course” score and the “Case study” score, with a Pearson correlation of 0.56 ( $p < .001$ ). Regarding groups in the study, the Person correlation has shown important differences between the participant’s scores. So for the

Group 1 a strong correlation ( $r_{xy} = 0.63$ ) as for all sample can be appreciate. However, the opposite results have been obtained for the Group 2 ( $r_{xy} = 0.25$ ) and with significant at the 10% level, has shown weak relationships between “Case study” score and “Global course” score evaluations.

Therefore, it has been demonstrated the existence of a positive relationship between both types of learning. A higher correlation has been found in the Group 1 between the “case study” score and the “Global course” score than in the Group 2. These results could be related to the specific field of knowledge involved. In other words, Natural Sciences (Group 1) could have more implication with this method of teaching than the Experimental Sciences (Group 2).

Regarding these results, the observed differences between the two groups may be due to differences in the way of perceiving and addressing the solution of cases between the two disciplines. While students of Natural Sciences (group 1) usually work with cases where open problems are solved, with multiple choices of answer, in which are used divergent thinking processes; Experimental Sciences students (group 2) usually work with closed problems with only one valid answer, in which are applied convergent thinking processes, therefore, they do not normally work with real cases, as it has been defined in the introduction of this work.

Finally, most of the evaluations from the written assessment of the course made agreed that the case study method had been useful for learning and in the need to include more real cases during the teaching learning processes. In other words, students regarded the case study as a positive method to their teaching practice.

According to these results, literature shows that traditionally, students of Experimental Sciences are more likely to use convergent thinking skills more than creative ones (Gómez, Martín-Díaz, & Gutiérrez, 2012). Besides, students of Natural Sciences, experiments more aspects linked to creative thinking skills as they use spaces in lessons to teach students to generate knowledge about the nature of science (Castro & Ramírez, 2013). Based on the research from Ambertom, Peterson and Welsh (2015) teaching cases can be used to situate both diversity and content area issues at the center of classroom discussion. Teaching cases could foster a critical and a creative discourse that helps teachers think in complex ways about authentic educational situations, and connect theory to practice.

In addition, most research explains the implication of problem solving in teaching cases, as case-based instruction is one method than teacher educators can use to incorporate social constructivist learning principles. Furthermore, in the process of problem solving it is used creative, critical and metacognitive thinking skills to operate and find a solution (Larraz, 2015). This assumption is according to the approach of deep learning (Marzano, 2002; Marzano & Pickering, 2006; Valenzuela, 2008). Moreover, many authors have proposed infusing critical and creative thinking skills in the classroom and in the content of instruction (Lipman, 2001; Swartz & Parks, 1994), but it is also probed the effectiveness of metacognition as an essential part of the problem solving process. Therefore, case study as a teaching method could foster creative, critical and metacognitive thinking skills in order to achieve a better performance in learning.

## 5. Conclusions

The case study method develops various transversal skills covered in the curricula of Higher Education and the Tuning Project (González & Wagenaar, 2003), such as fostering problem solving, decision making and acquiring thinking skills in the classroom. Furthermore, this specific case involves understanding a central psycho-affective dimension in the development of students in Higher Education which can predict an individual's psychological adjustment. Based on the analysis of the scores obtained and the evaluations made by the students, it has been reached the following conclusions which would be used to improve the methodology implemented for further research:

- It is necessary to incorporate more case studies throughout the course to support a more realistic and meaningful learning. The case study tool may promote a more real learning and also motivate students to perform learning tasks more successfully.
- Results have shown that the use of case study methodology has a greater effect considering the specific field, evaluated as more effective for the students' participants in this study related in general with natural sciences.
- If the use of the case study method is extended to more masters' courses the increased number of participants will lead to the possibility of improving the course and improving knowledge of the method both in creative and reflective terms. Thus, the learning achieved would be more enriching and better in quality.
- Improving the evaluation of the case study method through the creation of a survey in which all students could participate after the course. This would lead to the collection of more data regarding the quality of learning achieved by the students using the case study method.

This study has produced promising results in terms of the objectives set. The results obtained in this study are of the greatest use for evaluating the use of the case study method as a learning tool for students who in the future will have to deal with versions of the situations presented to them by means of this method. However, further research including active participation of students from other groups and specialties would be desirable in order to analyse the use of the method to some different specialties throughout learning.

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