

Practical application of
engineering work in class -
Statistical analysis of traffic on
a real road



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INTRODUCTION

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Groups

- STATISTICS, 2nd year Subject
 - Grado Ing. Informática
 - **Classroom**
 - 2 Grupos throughout 2 consecutive years
 - 23 students in year 2011/2012
 - 17 students in year 2012/2013
 - Only those students that handed in poll results are counted, so we have approximately a rough 85% of the total number of students represented in the study itself.



Objectives/Proposal Justification (I)

- The main objective of this study is to evaluate the greater involvement of engineering students in the study of statistics when faced with a real engineering problem.
- The study is focused around a class team project developed over the last two years in classes.



Objectives/Proposal Justification (II)

- Engineering students usually find difficulties applying the knowledge gained in a course with a strong theoretical background.
- What was sought:
 - To let the students work with a set of data closer to what they might find in an everyday practical situation
 - To see if the fact of dealing with a more realistic problem helped them to better assimilate the subject, becoming more involved with it.



Experience Description (I)

- Language background: Since 2011, all students of this degree must take one module per semester studied in English.
- The proposed project was the statistical analysis of the traffic of a two lane road.
- The project stated that an engineering company wished to build a road of similar characteristics of the one described through the given data, and that the students had to try to analyze and describe it through a series of tests seeking to extract all the useful information they.



Experience Description (II)

- The given set of data belonged to a three day campaign where around 19000 vehicles were counted.
- The data comes from the double loop detector station network of the Madrid Region in Spain where information is registered vehicle by vehicle.
- For each vehicle there is a subset indicating the precise date and time of its measurement, its speed, its length, its headway and a prediction of its classification.



Experience Description (III)

- The students were asked to carry out four successive reports of the analysis of the data provided.
- Reports had to be comprehensive and were assessed on the reasoning in the interpretation of statistical results and not on the fact of obtaining them.



Impact assessment

- To study the impact of the project upon the students and their perception of it, they were asked to answer a short questionnaire.
- The questionnaire was passed at the end of the course when they were no longer under the pressure of assessment.
- Those questionnaires were then filtered and studied to obtain an objective overview of the experience.



THE QUESTIONNAIRE (i)

- Since the students first language is Spanish, the questionnaire was handed out in that language.
- There were 7 questions. The first of which was the year the subject was coursed.
- The questionnaire was voluntary and “semi-anonymous”.



THE QUESTIONNAIRE (ii)

- Questions 2 to 6 were graded from 1 to 4 depending on the students perception 1 being nothing and 4 being a great deal.
- The seventh question was a personal opinion upon the experience. There was no space limitation.
 - Only 7 of the 4 students filled space 7.



THE QUESTIONNAIRE (itself) (I)

1. Asististe a clase en el curso: []2011/2012 []2012/2013

2. Crees que la realización de una práctica con datos reales afecta de forma significativa a la práctica en sí. ¿Percibes diferencias a las prácticas con datos “preparados”?

[]Nada []Poco []Algo []Mucho

3. ¿Consideras positivo el uso de datos reales en las prácticas de clase?

[]Nada []Poco []Algo []Mucho

4. ¿Crees que la utilización de datos reales suponen un acercamiento al mundo profesional superior a otros tipos de prácticas?

[]Nada []Poco []Algo []Mucho



THE QUESTIONNAIRE (itself) (II)

5. ¿Te gustaría que el uso de datos reales se extendiese a otras áreas más allá de la estadística?

Nada Poco Algo Mucho

6. ¿Crees que el uso de datos reales ha aportado en algo a tu comprensión última de la asignatura por encima de lo que lo habría hecho una práctica con datos preparados?

Nada Poco Algo Mucho

7. Si tienes alguna aportación u observación que hacer acerca del desarrollo de la práctica y su utilidad, por favor plantéala a continuación:



THE NUMBERS (speak for themselves)

	Students perception of the difference between real/false	How positive they find using real data really is	Approach to the professional world	How much would they like to find real world data in other subjects	How much did the project help them grasp subject issues
	Question 2	Question 3	Question 4	Question 5	Question 6
Number of 1's	0	0	0	0	0
Number of 2's	0	0	0	0	0
Number of 3's	15	1	5	5	13
Number of 4's	25	39	35	35	27
% of 3	60%	3%	14%	14%	48%
% of 4	40%	97%	86%	86%	52%
Means	3,63	3,98	3,88	3,88	3,68



THEIR COMMENTS

Es lo suyo la
implementación
de datos reales.



THEIR COMMENTS

Considero extremadamente importante el uso de datos reales ya que podemos ver y analizar posteriormente a la realización de la práctica, las consecuencias de los datos obtenidos en un entorno real.



THEIR COMMENTS

Realizar prácticas con datos reales ayuda a comprender mucho mejor la teoría aprendida en clase. Esto es así porque se pueden dar situaciones no convencionales y que éstas aporten conclusiones mucho más enriquecedoras que las situaciones y las conclusiones que se pueden dar en prácticas con datos no reales.

COMMENTS

Los datos reales aportan a la comprensión de las asignaturas y deberían implementarse en más áreas básicas y no sólo de los últimos cursos.



CONCLUSION (I)

- The study itself proved that the project was perceived as good/very good by the students
- They found it easier to confront the subject with a wider comprehension of its further application to a real life background.
- The examination results in the subject itself changed for the better after the project was finished.
- Students proved to be aware of this change.



CONCLUSION (II)

Noteworthy:

- Most groups used different statistical tools than those initially intended.
- This proves a broader interest in the project than in other with taken by these groups.



Thank you! Any questions?

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