

Design Of Innovation In A Technical Subject

D. Juárez, M. A. Peydró, M. J. Reig, and F. Parres

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Design Of Innovation In A Technical Subject

Juárez D.; Peydró M.A.; Reig M.J.; Parres, F.

*Mechanical and Materials Engineering Department
Valencia Polytechnic University (Alcoy Campus)
Plaza Ferrándiz y Carbonell, s/n 03801 Alcoy - España
djuarez@mcm.upv.es.*

Abstract. The greatest motivation found in the teaching of the subject Mechanical Technology is the ability to speak to students about manufacturing technologies. The main objective of learning in this subject is a global vision of the manufacturing process, and its optimization in terms of applicability to the real world. The best way for students to learn these concepts is for the teacher to explain them with a more global view aimed at reaching a comprehensive vision with a high degree of detail.

Keywords: Educational innovation, Technical subject, Engineering, Computer application.

PACS: 80

INTRODUCTION

In Mechanical Technology, a subject taught in the second year of Industrial Engineering, the greatest motivation for the teacher is the ability to talk to students about the manufacturing technologies on which they plan to apply all knowledge and skills they acquire in other subjects.

The main objective of learning in this subject is the overview of the manufacturing process and that the student be trained in the criteria necessary to choose the most suitable technology for the type of product manufacturing, and optimize its manufacturing process.

The best way for students to learn these concepts is to explain the concepts with a more global point of view (products which can be manufactured by selecting a particular technology and machines that allow it), until reaching a detailed understanding (calculations).

EXPERIMENTAL

Responsibility for education

The main responsibilities of teaching can be summarized as:

- Study, work and research to maintain the highest professional standards of knowledge and its transmission.
- Transmit, without omissions, knowledge leading to better training of learners.
- Collaborate actively in the organization of teaching.
- Evaluate the knowledge of students fairly and without distinction of any kind.
- Reflecting on those areas of their teaching that need improving.
- Share knowledge and experience with younger teachers of one's Department or Center.
- Document how teaching has evolved over time.

Methodology of teaching

The theory lectures will be 80% teacher oriented, with a teaching scheme based on:

- Start: daily programme, refresher + queries.
- Development: power point slides + video.
- Conclusion: review concepts + queries. A practical example.

The remaining 20% of the lectures will focus on problems based on computer applications and group dynamics.

Semana 1	Semana 2	Semana 3	Semana 4	Semana 5	Semana 6	Semana 7	Semana 8	Semana 9	Semana 10	Semana 11	Semana 12	Semana 13	Semana 14	Semana 15
Tema 1	Tema 3	Tema 6	Tema 9	Tema 10	Tema 13	Problemas Tema 14	Tema 16	Tema 19	Tema 20	Tema 23	Tema 26	Problemas Tema 26	Tema 29	
Tema 2	Problemas Tema 3	Tema 7	Problemas Tema 9	Tema 11	Problemas Tema 13	Tema 15	Tema 17	Problemas Tema 19	Problemas Tema 20	Tema 24	Tema 26	Tema 27	Tema 29	
Problemas Tema 2	Tema 4	Tema 8	Problemas Tema 9	Tema 12	Tema 14	Problemas Tema 15	Tema 18	Tema 20	Problemas Tema 20	Tema 26	Problemas Tema 26	Tema 29	Tema 29	
		Practica 1	Practica 2	Practica 2	Practica 3	Practica 4	Practica 5			Practica 6	Practica 7		Practica 9	Practica 9

FIGURE 1. Programme of the subject.

The evaluation of this part will be based on theoretical and practical review work, with a value of 50% each part.

The practical classes will focus on the laboratory. They will be descriptive and each will cover a practical technology. The student will develop a practical work in business, which will represent everything covered in the subject.

TABLE 1. Practice Programme.

N	Practice Title	Hours
1	Introduction and handling of equipment and measuring instruments. Measuring angles and lengths.	2
2	Introduction to the measurement of shapes and position in CMM.	2
3	Mold Shaping.	4
4	Plastic deformation Shaping.	4
5	Electric arc welding with coated electrode.	4
6	Revolving parts Machining: turning and boring.	4
7	Prismatic parts and holes machining: milling and grinding.	4
8	Polymeric materials Shaping: injection.	2
9	Numerical control machine tool: Mill and Lathe.	4

The assessment practices will be based on attendance, at least 80%, and students must demonstrate the ability to work in a group, giving reports to the rest of the class.

Printed copies of the documentation and transparencies can be obtained from the microweb of the university.

Innovation in education

The teacher must strive to ensure that classes are entertaining, conceptually complete, with a vision and practical application that has an explicit link with the environment, schools, certification and other subjects they are studying or intending to pursue.

Refocus the topics on the agenda, making the student see "the tree while seeing the forest." Further topics, also seen as connected with other subjects and with potential jobs (the goal of certification) in which they can implement their knowledge, and with businesses in the area etc.

The ideas generated for the design of innovation are as follows:

- Creation of computer applications to resolve problems of each technology.
- Incorporating a graphical simulation that allows the student to understand the process from the inside.
- Real practical case at the end of the lesson, explained by the teacher.
- Incorporation of lectures given by experts and / or alumni currently working on technologies is something that enriches the subject and motivates the student to continue in their daily work.

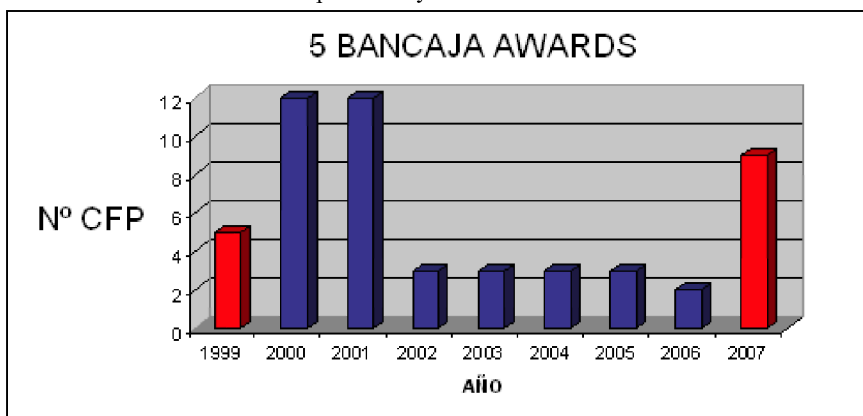
The assessment of innovation is based on the following parameters:

- Marks from surveys I.C.E.
- Increased number of practical examples in class.
- Number of applications for copies of applications / direct downloads via intranets.

RESULTS

The evidence of good performance, by students and colleagues, are:

- Positive developments in surveys.
- Bancaja Awards for end of degree projects (5)
- Reports from people who have recruited students of the subject.
- Increase in the enrollment of the subject as a result of the recommendation of students who have studied in previous years.



TOTAL: 52

FIGURE 2. Graph showing the trend in the number of projects winning prizes.

A result of the initiative is the companies that have received students for their end of degree project, which include the following:

- Menaplast, S.L. (Ibi – Alicante - Spain)
- Feber, S.L. (Ibi – Alicante - Spain)
- FAMOSA (Onil – Alicante - Spain)
- Motores Carchano, S.L. (Alcoy – Alicante - Spain)
- Rasilán, S.A. (Ontinyent – Valencia - Spain)
- Saneamientos Colón, S.L. (Alcoy – Alicante - Spain)
- IMPURSA (Alcoy – Alicante - Spain)
- Vaplast, S.L. (Ibi – Alicante - Spain)
- Bolaseca, S.L. (Torres de Cotillas– Murcia - Spain)
- Clece, S.A. (Murcia - Spain)
- Montes Tallón, S.A. (Alicante - Spain)
- Crearplast, S.L. (Ibi – Alicante - Spain)
- Gaviota SIMBAC, S.L. (Sax – Alicante - Spain)

An average of 15 student practical projects in businesses in the area have culminated enriching experiences for the students in which they have had the opportunity to put their knowledge into practice.

Finally, we should outline the goals or objectives both in the short term (one year) and long term (three or more years):

- In planning:
 - Reassessment throughout the course and creation of new notes.
 - Assign a time to each subject and stick to it..
 - Using other methods apart from the teacher based lesson.
- In action:
 - Explain in class what is really important.
 - To conduct activities in class.
- In review:
 - Assess at several points of the course.

These same goals are the goals for further progress in improving this subject.