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Graphic design in bachelor's degree in industrial design engineering and product development

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Abstract

The purpose of this paper is presenting the teaching project developed for the subject of Graphic Design and Communication of the Bachelor's Degree in Industrial Design Engineering and Product Development of the School of Design Engineering (Universitat Politècnica de València, Spain). We analyze three background: graphic design-related subjects in the previous degree both the School of Design Engineering (UPV) and other Spanish universities; educational projects drawn up by other universities for this same subject; and other subjects related to graphic design that are also taught in the titling of the School of Design Engineering (UPV) degree. After this, we comment and explain the different sections of the teaching guide: skills and training objectives, recommended knowledge, content, teaching-learning methodology, and evaluation. This educational program aims to train future industrial designer for the development of basic applications of graphic design (posters, brochures, advertisements, etc.) to help the presentation and marketing of industrial product.

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1. Introduction

This paper presents the teaching guide prepared for the Graphic Design and Communication course in the the Bachelor's Degree in Industrial Design Engineering and Product Development of the School of Design Engineering at the Universitat Politècnica de València (UPV). The course has 6 credits (ECTS), is compulsory and is offered during the first semester of the third academic year [1].

The importance of this subject lies in the change it meant compared to the previous study plan (Official Gazette, 12 3, 1998; Özçınar, 2006). Formerly, subjects related to graphic design were optional. Nowadays this subject is mandatory. Thus, new degree qualification recognizes the importance of graphic design in shaping the future career in Industrial Design and Product Development, relationship already pointed out by Richard Buchanan in 1992 [2].

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The work is structured into three sections. The first deals with the background analysed, the teaching project is presented in the second and the third sets out the conclusions.

2. Background

Before turning to the subject "Graphic design and communication" teaching project, we turn magazine to the subjects related to graphic design that are taught in the previous degree both the School of Design Engineering (UPV) and other Spanish universities. We will then review the educational projects drawn up by other universities for this same subject. Finally, we will see other subjects related to graphic design are also taught in the titling of the School of Design Engineering (UPV) Bachelor's Degree.

2.1. Courses on graphic design in the previous curriculum

Analyzing the plan of studies prior to the qualification of Bachelor's Degree - in accordance with the Royal Decree 1462 / 1990, 26 October - several Spanish universities, noting the existence of subjects related to graphic design. It is mostly subjects of optional character (except in the Universidad de Valladolid). Table I shows the name of these courses, the University which are taught and their characteristics.

Table I. Subjects related to graphic design in the previous curriculum taught in different Spanish universities

Subject	University	ECTS	Type	Course	Semester
Graphic design in the industry	Universidad de Málaga	4,5	Optional	-	-
Graphic design	Universidad de Sevilla	6	Optional	-	-
Graphic design	Universitat Jaume I	6	Optional	-	-
Corporate image and color	Universidad de Las Palmas	9	Optional	3	Annual
Design and visual communications	Universidad de Valladolid	6	Compulsory	3	2
Corporate and graphic image	Universidad de Zaragoza	4,5	Optional	3	2
Graphics	Universitat Politècnica de València	4,5	Optional	3	1

The objectives are common to all of them and seem to agree in wanting to equip students with the knowledge and skills needed to generate a graphic communication to support the industrial product. Differ, that Yes, in the emphasis given to the fundamentals of graphic design and each media which can materialize this graphic communication. Content common to most of these subjects can be broken down into three sections: Fundamentals of design or visual communication, graphic design and computer tools applications.

In the basics section makes reference to the colour, the two-dimensional form, typography and texts, images and the composition. With regard to applications, all contemplated the logos and Visual identities design less two (Universitat Jaume I and Universidad de Valladolid). In fact, we found that in four of them this application of graphic design becomes the central axis of the subject. In turn, also provided the design of other graphical applications such as posters, brochures, multimedia, web, mailing, tags, billboards or banners. As regards the computer tool, although not referred to any specific program, refers tools of graphic design and retouching images.

Teaching-learning methodology is based on lectures and practical classes. Depending on the University, the number of theoretical hours is more or less. In practical classes students develop various practical exercises related to the subjects, and in certain cases as in the School of Design Engineering (UPV), the student has completed a graphic design project.

Finally, the evaluation usually revolves around the resolution of the exercises proposed in class or project. Also in some cases provide a review to assess the knowledge acquired.

2.2. Educational projects of the subject in other Spanish universities

Other Spanish universities have also followed the recommendation given by the white Paper [3] and have included in their curricula for the Bachelor's Degree in Industrial Design Engineering and Product Development a

compulsory subject related to graphic design. In order to analyze their teaching programmes, performs a search on the web pages of each University. However, only three universities that had published the Guide to teaching of the subject were located: Universidad de Mondragón, Universidad de Zaragoza and Universidad de Valladolid. Table 2 contains the name and characteristics of the subjects.

Table 2. Subjects similar to “Graphic Design and Communication” at other Spanish universities

Subject	University	ECTS	Type	Course	Semester
Graphic design	Universidad de Mondragón	6	Compulsory	3	2
Graphic design and communication	Universidad de Zaragoza	6	Compulsory	2	2
Design and visual communications	Universidad de Valladolid	6	Compulsory	1	2

Notes, first, that they are all binding, unlike the analyzed in the previous section. The course in which they are taught varies: first, second or third.

Regarding to competencies and objectives, the three try to convey to students the skills needed to achieve a graphic presentation effective for the entire project.

The contents, the three subjects cover the fundamentals of graphic design and methodology of the graphic project. Likewise, the three cover the design of Visual identities but with different emphasis. In the Universidad de Mondragón and the Universidad de Valladolid, this is practically the only application of graphic design that is mentioned. On the other hand, in the Universidad de Zaragoza is also the development of graphic design applied to product, packaging, advertising, editorial, multimedia design, signage and scenic spaces.

Teaching-learning methodology is similar: masterclasses for the theoretical content, resolution of exercises for practical content and individual development or in a project group.

The form of assessment is also similar: practices of classroom, project and reviews.

2.3. Subjects related in the new Bachelor's Degree of the School of Design Engineering (UPV)

As a last step before starting the educational programming of the subject, it must know what other subjects treat the discipline of graphic design in the same Bachelor's Degree. Know its contents will be of vital importance to avoid overlaps and gaps.

Analyzing the curriculum of the new Bachelor's Degree [4], we find three more related to the graphic design subjects. They are subjects of optional character and are taught chronologically after "Graphic design and communication".

As this is of courses not yet offered, no teaching guide has been published. The only existing information are descriptors or summary of content that appears in the report of verification of the title. These are the following:

- Graphical analysis and presentation of the industrial product: techniques of graphic presentation of the industrial product, design criteria for the presentation of the project, identification of the differential values of the product for its communication, professional presentation of the product.
- Graphic communication and corporate identity I: design of Visual identities, methodology for the development of a project of visual identity.
- Graphic communication and corporate identity II: the corporate visual identity, graphic applications of the visual identity manual.

Therefore, through these courses students will learn to graphically present an industrial product and develop a visual identity, along with the manual and graphical applications of the brand. To avoid overlaps, the subject of "Graphic design and communication" should ignore these contents or treated superficially.

3. The teaching project

The following is a draft of the teaching project developed for the subject of Graphic Design and Communication of the Bachelor's Degree in Industrial Design Engineering and Product Development of the School of Design Engineering (Universitat Politècnica de València, Spain).

To do so is taken into account existing in the old degree subjects related to graphic design, educational projects drawn up by other universities for this same subject and, finally, the subjects about graphic design that are taught in the same degree.

The teaching project is structured in five sections: skills and training objectives, recommended knowledge, content, teaching-learning methodology and evaluation, following the sections recommended at UPV teaching guide [5].

3.1. Competencies and objectives

Competencies and skills [6] to be employed in the course are as follows. They will orient students on what is expected from them and how to direct their work in order to reach these goals [7].

- Creative capacity and development of the imagination.
- Capacity for the use of manual and computer techniques of representation.
- Ability to communicate in formal, graphic and symbolic languages.
- Acquisition of graphical and manual dexterity.

These powers are specified in the following learning objectives:

- Applying the basic principles of graphic design for graphic communication of industrial product.
- Designing graphic elements of communication support to the industrial product in any of the phases of its development.
- Use to level half a computer program graphic design.
- Properly applying the color for a graphic product.
- Applying proper typography and texts in a graphic product.
- Compose a graphic product properly.
- Identify and projecting the various stages of a graphic project since the drafting of the briefing and objectives to end production approach.

3.2. Recommended knowledge

For the module of "Fundamentals of design", where the subject is, is recommended to have acquired the powers corresponding to the "Basic training" module. This module contains subjects related to visual communication as Artistic Expression and Graphic Expression.

3.3. Content

The subject descriptors appearing in the memory of verification of the title are as follows: concepts of graphic design, typography, color, composition, basic layout, methodology of the graphic project, and graphic design by computer.

Starting from them and taking into account the background study, distributed the subject in three blocks.

- Fundamentals of graphic design: What is graphic design, History of graphic design, The colour, Typography and text, The images, The composition.
- Computer graphic design: General description of the work area, Configuration of the document, Organization of the page, Drawing, Color, Text, Printing, Work with other applications.
- Applications of graphic design: Corporate visual identity, Poster, Print advertising, Brochures and instruction books, Web pages, Promotional media.

To contemplate two elective course focused on the development of visual identities and their applications curriculum, was raised in a first time eliminate any reference to this aspect in the contents. However, reflection, it was decided to include a small section so that all students may be pursuing or not after the optional had a reference about the benefits of the brand and its application coordinated for both the company and the product.

3.4. Methodology of teaching and learning

Teaching methodology is chosen on the basis of the learning objectives [8] and content. We establish a methodology based on the active participation of the students. Lectures do not exceed 30 minutes and it there is usually no more than two at each meeting.

Students work in groups of three. These groups are formed the first day of class and are maintained throughout the course. Generally, the first part of the tasks group who are responsible should be settled individually and students develop them outside the classroom in advance of the meeting. Once in class, students pooled their individual work and elaborated the proposal of group. Individual work is prepared so that all should be its part to that group's work is correct.

Likewise, all sessions are carried out presentations by students. Sometimes exposed theoretical works and others discussed practical work. In any of the forms, the teacher evaluates the communication and proposes strategies for improvement. It is intended that all pupils can expose in public at least once throughout the course.

In the first part of the course, students works of theoretical type made to strengthen and improve the understanding of the concepts that are part of the block of fundamentals of graphic design. At the same time, working with the computer tool and in this case, asks students the resolution of a number of practical tests.

In the second part of the course, corresponding to the block of graphic design applications, the student work focuses on the resolution of several basic projects that develop over one or two sessions.

3.5. Evaluation

The main instrument of evaluation is the portfolio [9]. This portfolio is done in group but in some sections working individually. Thus, customized for each student the monitoring and evaluation is possible.

The portfolio delivers complete at the end of course but provides an intermediate delivery in the middle of semester. This release consists of tutoring assistance and in the review of the portfolio by the professor. In parallel, at the beginning of each session, are devoted 10 minutes to put in common the state of the portfolio.

The portfolio includes all the work done in the course together with a small reflection of the learning process, the goals achieved and problems encountered. Therefore, it is the second mode of implementation for portfolio in higher education established by Meeus et al. [10]. This evaluation tool becomes this way a part of the teaching content [11].

Along with the portfolio is also evaluated the resolution of the theoretical and practical exercises. This evaluation is carried out throughout the session and allows students to get an idea of your progress in the course.

4. Conclusions

It has been teaching project developed for the "Graphic design and communication" course of Bachelor's Degree in Industrial Design Engineering and Product Development of the School of Design Engineering (UPV). The subject has 6 ECTS and is mandatory.

Several sources have been consulted for its elaboration. Firstly, graphic design-related subjects in the curriculum above both the School of Design Engineering (UPV) and other Spanish universities. On the other hand, the subjects of a similar nature that are taught in universities in the new degree qualification.

As to the subject of "Graphic design and communication" in three blocks are planned: Fundamentals, computer tool and graphic design applications. During the first two blocks the student develops practical and theoretical exercises. In the last block, the student solves different Basic projects. Throughout the course the student develops a

portfolio where it picks up its work and the evolution of their learning. This portfolio is the main instrument of evaluation.

This teaching program aims to train future industrial designer for the development of basic applications of graphic design (poster, brochure, advertisement, etc.) to help the presentation and marketing of industrial product. By being a compulsory subject that will be extended by all pupils, you can achieve incorporate the discipline of graphic design to the baggage of knowledge, skills and abilities of the future industrial designers.

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