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# Analysis of Teaching Methods in Graphic Design in the Galician University System (GUS) in Spain

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**ABSTRACT** The convergence towards the European Higher Education Area involved a profound rethinking of the teaching process used by university teachers. This situation forced professors to rethinktheir teaching methods in an individual, professional and anthropological way, given the importance of teaching methodologies in the new higher education framework. The sample of this paperwas collected through the teaching guides of all the technical degrees containing any subjects related to Graphic Design of all the Universities in Galicia (Spain) to find out which teaching methods are used. In order to achieve this objective, a mixed methodology was carried out. The results indicate that the educational strategies have not changed, and traditional and archaiclecture is still the most widely used.

## INTRODUCTION

Spain's access to the European Higher Education Area (EHEA) implied a profound rethinking of the teaching process used by professors due to the needof introduction of a way of learning through skills, rather than memorization-based learning. This goal meant the biggest change in relation to educational methodologies so far. For teachers, moving towards an educational model where the students' learning process prevails meant a difficult challenge, thus making a difference regarding the low student participation involved in the traditional model.

The objective of this new vision was to create a connection between the learning experience at the University and the skill requirements that students will need to evidence in a real job situation. For this reason, teaching methods continue to be tested to improve the teaching and learning process in Higher Education (Huff et al. 2016). The EHEA represented therefore a great opportunity to rethink the issue of educational methodologies aimed at improving student learning, increasing their level of satisfaction and motivation as well as their teachers' (Kolloffel et al. 2011; Rajagopal et al. 2012; Rodríguez 2012).

In this process of modernization of education, there is no place for the traditional lecture-focused on the speech of the educator. Moreover, learning no longer relies solely on theoretical knowledge, which despite being essential is not the only need. For this reason, professors should be more concernedto lead a methodology focused on the student and the way they learn better (López-Chao et al. 2014).

In order to achieve the goals that EHEA set, other teaching methods will need to supplement the lecture teaching method. For instance, seminars and workshops encourage the development of a sense of responsibility, teamwork, leadership, and human formation of the student (Mingorance 2013). Nonetheless, there are more innovative teaching theories to support learning and that improve valuable features in an architect or engineer as the creativity as Problem-Based Learning or Analytic Composition Method (Hui-Ping et al. 2016). Therefore, this process should have implied a deep renewal of professor teaching skills **(**Yasak and Alias 2015) that should have been reassessed in an individual, professional and anthropological way. Even though professors have shown willingness and interest to participate in training courses, this does not necessarily assure the fact that they are prepared to implement these new methodologies in teaching their students (Andreu and Labrador 2011).

Obviously, each field of knowledge has its own inherent characteristics that need to develop. For this reason researchers try to develop new teaching methods in order to achieve those different skills, to reduce the gap between theo-

ry and practice (Urbikain and López de Lacalle 2016), as each requirementof knowledge will need a rethinking for its implementation in the teaching process (Kagan 2014).

Regarding the field of Graphic Expression, it is necessary to clarify that the traditional teaching way of the subject has been carried out through two-dimensional methods—the blackboard and the paper (López-Chao et al. 2014). This subject deals with the representation of a three-dimensional object on a flat surface, enabling the spatial resolution of two-dimensional problems through two-dimensional technics. Currently, computers facilitate the understanding and learning of them acquisition through modeling and three-dimensional visualization. Consequently, 2D drawing and ancestral teaching methods have been changed to a combined 2D or 3D computer support, whose possibilities have motivated a new teaching approach (Natividad et al. 2011) and that implies the need of more participatory teaching methods for students (Marqués 2013; Obradovic et al. 2015).

### Objective

The purpose of this paper was to find out what teaching methods areused in the degrees of the Galician University System (SUG), in subjects related to the teaching of Graphic Expression to find out if Galician professors have adapted their teaching methods to the new guidelines set by the European Higher Education Area.

## METHODOLOGY

In Galicia, the Graphic Expression subject is present in several degrees. Nevertheless, there are no studies to find out how they are taught, if there is a common set of criteria in this teaching plan or if there is widespread use of ICT. That is why this research is necessaryto improve the teaching quality.

Given the importance of teaching methodologies in the new higher education framework, official teaching guides of all the subjects related to Graphic Design in the Universities of Galicia (Spain) have been analyzed in order to find which teaching methods are used by each degree.

To carry out the research, the researchers have made a model of quantitative and qualitative research. It can be considered quantitative in the form of process data, as it is collected at the end of the process and quantified for analysis. However, it is qualitative because the data is interpreted taking into account not only the statistics but analyzing them by categories following qualitative methods (they have been analyzed by grouping and organizing them by categories, previously established by researchers, whose development has led to new analysis and explanations). Qualitative development is also present in the analysis of the contents. All this leads one to conclude that, methodologically, the present research, conducted during 2014-2015, is based on both qualitative and quantitative research.

### Sample

The current study was carried out through the teaching guides of the three Galician Universities, namely, University of A Coruña (UDC), University of Santiago (USC) and University of Vigo (UVigo). The sample size is 47, and represents one hundred percent of the subjects related to Graphic Design in 31 degrees of architecture and engineering. UDC degrees (14) have 25 of the subjects, USC degrees (7) have 12 subjects of the sample, whereas UVigo (10) has 10 of the subjects. In terms of percentage, the subjects of the sample represent forty-five percent from UDC, twenty-three percentfrom USC andthirty-two percent from UVigo.

The data collection process lasted for 4 months. At the beginning of the term of 2014-2015, teaching methods of every degree related to architecture and engineering were analyzed to generate a database with all the different subjects related to Graphic Expression in the Galician Universities. Data was simultaneously downloaded and qualitatively analyzed to understand the state of the art in terms of teaching methods.

### Statistical Analysis

All the data was analyzed using the statistical software program SPSS, version 16.0 (SPSS, Chicago, IL, USA). Descriptive statistics were calculated.

## RESULTS

### University of A Coruña

Within the 14 degrees that were studied from the University of Coruña, there are 27 subjects

related to Graphic Expression (from now on, GE), including 20 basic training courses, five compulsory subjects and two optional subjects taken into account. All of them are semester subjects and with an allocation of 6 ECTS, except the subject called Drawing in Civil Engineering II, that belongs to the Degree in Civil Engineering Technology, which has 9 ECTS and lasts the whole academic year. Teaching methods that professors use to develop their teaching in these areas include, Initial Activities (I.A.), Master Class (M.C.), Workshops (W.), Tasks (Tas.), Seminars (Sem.), Laboratory (Lab.), Documentary Sources Analysis (D.S.A.), Troubleshooting (Tro.), ICT Practices (ICT), Research (Res.), Field trips (F.T.), Portfolio (Port.), Collaborative Learning (C.L.) and Objective Test (O.T.) (Table 1).

The methodology used by one hundred-percent of the faculty staff of the UDC is the objective test (OT). Traditional Master Class (MC) is used by eighty-nine percent of the sample, that represents therefore the second most used methodology. However, methodologies that should be important as practices through ICT, which are so necessary in this field, are only present in 14.8 percent of the subjects of Graphic Expression at the University of A Coruña. The same situation occurs for collaborative or group work, a methodology used by only eleven percent of professors.

**Table 1: Teaching methodologies used in VGE at University of A Coruña**

| | | | | *UDC teaching methods* | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Degree in* | | *Subject* | *IA* | *MC* | *W* | *Tas* | *Sem* | *Lab* | *DSA* | *Tro* | *ICT* | *Res* | *FT* | *Port* | *CL* | *OT* |
| 1. | Architecture | 1.1. | Graphic Expr. | | X | X | X | | | | | | | | | | X |
| | | 1.2. | Tech Draw | X | X | X | | | | | | | | | | | X |
| 2. | Technology of Civil Engineering | 2.1. | Tech Draw I | | X | | X | X | X | | | | | | | | X |
| | | 2.2. | Tech Draw II | | | | | | | | | | | | | | X |
| | | | | X | | X | | X | | | | | | | | X | |
| 3. | Public Constru | 3. | Tech Dra | X | X | X | X | | | X | X | | | | | | X |
| 4. | Nautical and Marine Techn | 4.1. | Graphic Expr. | | X | | | | X | | | X | X | | | | X |
| 5. | Marine Engineering | 5.1. | Graphic Expr. | | | | | | | | | | | | | | X |
| | | | | X | | X | X | | | | X | | | | | X | |
| | | 5.2. | Mecha Draw | | X | | X | X | | | | X | | | | | X |
| 6. | Technical Architecture | 6.1. | Desc. Geom. | | X | | | | | | X | | | | | | X |
| | | 6.2. | Graphic Expr. I | X | X | | | | X | X | | | | X | X | | X |
| | | 6.3. | Graphic Expr. II | X | X | | X | | | X | | | | X | X | | X |
| | | 6.4. | Geometry | | X | | | | | | X | | | | | | X |
| 7. | Naval | 7.1. | Graphic Expr. | | | | | | | | | | | | | | X |
| | | 7.2. | Naval Dr. | X | X | X | X | | | | X | | | | | | X |
| 8. | Propulsion and Ship Services | 8.1. | Graphic Expr. | | | | | | | | | | | | | | X |
| | | 8.2. | G.R of Sis | X | X | X | X | | | | X | | | | | | X |
| 9. | Naval and Ocean Eng. | 9.1. | Graphic Expr. | | | | X | | | | | | | | | | X |
| 10. | Mechanics | 10.1. | Graphic Expr. | | X | | | | | | | | | | | X | X |
| | | 10.2. | C. D. and Analysis | X | | | | | | | | | | | X | X | |
| 11. | Industrial Technical Eng. | 11.1. | Graphic Expr. | | | | | | | | | | | | | X | X |
| 12. | Electrical Eng. | 12.1. | Graphic Expr. | X | X | | | X | X | | X | | | | | | X |
| | | 12.2. | I D.&CAD | | X | | X | | X | | X | | | | | | X |
| 13. | Electronic and Auto Eng. | 13.1. | Graphic Expr. | X | X | | | X | X | | X | | | | | | X |
| | | 13.2. | I D.& CAD | | X | | X | | X | | | | | | | | X |
| 14. | Industrial and Product Design Engineering | 14.1. | Gra. Exp. | X | X | | | | X | | | | | | | | X |
| | | 14.2. | Applied Graphic Expression | | X | | | | X | | | X | | | | | X |
| | | 14.3. | CAD | | X | | | | X | | | | | | | | X |
| | | | | 9 | 23 | 5 | 12 | 5 | 11 | 3 | 8 | 4 | 1 | 2 | 2 | 3 | 27 |

**University of Santiago**

Within the 7 degrees at the University of Santiago, 12 courses are related to Graphic Expression, including 7 basic training subjects and 5 elective subjects, all of which are contemplated in this paper. The duration of all of them is a semester, and they are each 6 ECTS of basic training (except Graphic Expression in Engineering, part of the Degree in Civil Engin-eering, which has 9 ECTS and is an annual subject), and the elective subjects are 4.5 ECTS each.

In this case, the teaching methods that professors use in USC include Master Classes (MC), Laboratory Practice Sessions (Lab.), Seminars (Sem.), Practice (Prac.), Group Tutoring (GT), Individual Tutoring (IT), HomeTasks (Tas.), Virtual Campus (VC), Class Attendance (A.) and Evaluation (E) (Table 2).

The Master Class continues to be the teaching method most used by professors in charge of Graphic Expression related courses at USC with a 91.6 percent. On another hand, twenty-five percent of professors include class attendance as a "teaching methodology". However, as important as practical methodol-ogies through ICT are in a field like this, they are not present in the teaching methods of Graphic Expression subjects at the University of Santiago. This situation is repeated for group work method.

**University of Vigo**

Among the 10 degrees object of study at the University of Vigo, all of them have one subject related to Graphic Expression. All of them are semester subjects, having an assignment of 9 ECTS, except those belonging to the Degree in Energy Engineering, Engineering for Mineral and Energy Resources, and Mechanical Engineering Degree taught at the University Centre of Defense (Naval Military School of Marín). This is a surprising fact, since this last degree is also taught at the Vigo Campus, where Graphic Expression has 9 ECTS.

The teaching methods used by professors to develop their teaching include Master Sessions (MS), Group Tutorials (GT), Problems/Exercises (Pr/Ex.), Integrated Methodologies (IM), Laboratory Practice (Lab), Seminars (Sem.), Collaborative Learning (CL) and Projects (Proj) (Table 3).

At the University of Vigo, there are three methodologies used by one hundred percent of the teachers, that is,the Lecture (or Master Class), Group Tutorials and Resolution of Problems and/

**Table 2: Teaching methodologies used in VGE at the University of Santiago**

| *Degree* | *Subject* | *USC teaching methods* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *M. C* | *Lab* | *Sem* | *Prac* | *GT* | *IT* | *Tas* | *VC* | *A* | *E* |
| 1. Degree in Chemistry | 1. Graphic Expression | X | X | X | | X | X | X | X | | |
| 2. Degree in Industrial Chemical Processes | 2. Graphic Expression and CAD | X | X | X | | X | X | X | X | | |
| 3. Degree in Agricultural and Rural Engineering | 3.1. Graphic Expression in Engineering | X | | X | X | | | | | | X |
| | 3.2. CAD. Applied Graphic Expression | X | X | | | | | | | | |
| 4. Engineering Degree in Agro-Food Industries | 4.1. Graphic Expression in Engineering | X | | X | X | | | | | X | |
| | 4.2. CAD. Applied Graphic Expression | X | X | | | | | | | | |
| 5. Degree in Forestry and Natural Environm. | 5.1. Graphic Expression in Engineering | X | | X | X | | | | | X | |
| | 5.2. CAD. Applied Graphic Expression | X | X | | | | | | | | |
| 6. Degree in Civil Engineering | 6.1. Graphic Expression in Engineering | X | | X | X | X | X | X | 2 | | X |
| | 6.2. CAD. | X | | | X | X | | | | | X |
| 7. Degree in Geomatics and Topography | 7.1. Representation Systems | X | X | | | X | X | X | | | X |
| | 7.2. CAD. | X | | | X | X | | | | X | |
| | | 11 | 7 | 6 | 5 | 6 | 5 | 4 | 2 | 3 | 4 |

**Table 3: Teaching methodologies used in VGE at the University of Vigo**

| *Degree* | *Subject* | *UVigo teaching methods* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *MS* | *GT* | *Pr/ex* | *IM* | *Lab* | *Sem* | *CL* | *Proj.* |
| 1. Degree in Electrical Eng. | Graphic Expr | | X | X | X | X | | | |
| 2. Degree in Ind. and Aut. Electronic | Graphic Expr | X | X | X | X | | | | |
| 3. Degree in Industrial Organization | Graphic Expr | X | X | X | X | | | | |
| 4. D. in Industrial Chemistry | Graphic Expr | X | X | X | X | | | | |
| 5. D. in Technical Industries | Graphic Expr | X | X | X | X | | | | |
| 6. D. in Mechanical Engineering | Graphic Expr | X | X | X | X | | | | |
| 7. D. in Forestry Engineering | Graphic Expr | X | X | X | | X | | | |
| 8. D. in Energy Engineering | Graphic Expr | X | X | X | | X | X | | |
| 9. D. in R. M. And E. Engineering | Graphic Expr | X | X | X | | X | X | | |
| 10. D. in Mechanical Engineering | Graphic Expr | X | X | X | | X | X | X | |
| | | 10 | 10 | 10 | 6 | 3 | 3 | 1 | 1 |

or Exercises. However, as important as practical methodologies through ICT are, they are not present in the areas of Graphic Expression at the University of Vigo. This situation is repeated for group work method.

### Galician University System (SUG)

Within the three Universities, 21 types of different teaching methods are used to ultimately play out the same teaching process, which is teaching Graphic Design. Obviously, most of them are used in a hardly significant way, with only four of thembeing used at the three Galician Universities (Master Class, coursework, seminar and laboratory practices), as seen in Table 4.

**Table 4: Teaching methodologies used for VGE in the GUS**

| *Teaching method* | *UDC* | *USC* | *UVIGO* |
|---|---|---|---|
| Initial activities | 33.3% | | |
| Master class | 89% | 91.6% | 100% |
| Workshop | 18.5% | | |
| Course work | 45% | 33.3% | 100% |
| Seminary | 18.5% | 50% | 30% |
| Laboratory practices | 40.7% | 58.3% | 30% |
| Documentary sources analysis | 11% | | |
| Problems | 29.6% | | 100% |
| ICT practises | 14.8% | | |
| Investigation | 7.4% | | |
| Field trips | 7.4% | | |
| Portfolio | 7.4% | | |
| Group work | 11% | | |
| Objective test | 100% | 33.3% | |
| Practices | | 41.6% | |
| Group tutoring | | 50% | |
| Individual tutoring | | 41.6% | |
| Virtual campus | | 16.6 | |
| Class assistance | | 25% | |
| Integrated methodologies | | | 60% |
| Projects | | | 10% |

## DISCUSSION

Spain's access to the EHEA should have involved performing "reflection, not only individually, but also together in what refers to the three fundamental tasks and interlinked educational intervention, planning, execution of the instruction and assessment" (García and Morillas 2011:114). However, it seems that the professors in charge of the subjects analyzed from the three Galician Universities have not really adapted to the new situation, despite the new curriculum should have taken place four years ago.

In the field of Graphic Expression, the use of ICT should be unanimously and significantly included as a teaching method (Mckenna and Carberry 2012; Yasak and Alias 2015; Urbikain and López de Lacalle 2016). People must constantly develop and renew themselves individually, socially, professionally and anthropologically throughout their lives in the social and educative world (Uzunboylu and Okan 2015).

This research tries to address an issue that has not been properly researched. It is necessary to analyze this contextin order to reach higher levels of performance and efficiency in educational excellence. At the same time that this whole change was meant to start, many professors were claimed to rethink the teaching process of courses related to the graphic-visual environment, due to exhaustion (Fernández Coca 2012; Lopez et al. 2014; Muñoz and Mejía 2015). In this sense, there are recurrent investigations that demonstrate that the theory and practice of innovative teaching follow different paths. As teaching-learning processes have being mostly carried on with technology from the fifteenth century, generally lacking any media, devices

and languages invented in the twentieth century and the technology that will dominate the twenty-first century (Gavino et al. 2012). For this reason, teaching practice is not connected to the professional future of students.

The exploration of the multiple possibilities of the subject will be the teacher's task, not only in a theoretical line but also in the sense of exploiting the skills that generate a better use of the subject (Masek and Yamin 2012). There must be a program to show professors how to organize learning environments (Bayindir 2014).

## CONCLUSION

The Bologna process has not contributed to a renewal in terms of teaching methods by professors in Galicia, since lecture-based learning is still the most widely used.

It is also surprising that such essential methodology like initial assessment, which serve to identify previous knowledge of students in order to make a more realistic programming according to their needs, are not present at any of the University of Santiago or the University of Vigo. In A Coruna, even if they do make an appearance, it is only 33.3 percent of the sample.

A renewal of the teaching staff's practices in these universities is necessary due to not having adapted their teaching practice to the guidelines of the European Higher Education Area.

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