

The future of Double Degrees in Engineering Education.

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INTRODUCTION

We show and discuss in this paper a review of the concept of dual degree and Master level reorientation in Engineering. Double degree agreements aim to provide interdisciplinary or specialized training. The dual degree concept can be applied between complementary degree from the same university or between different universities. The dual training is usually aimed at emerging skills that have been highlighted in several prospective studies sponsored by the European Community. It is intended to guide the student in choosing the most convenient ways for their interests and aptitudes.

In addition to the definitions and ideas about doubles titles, we show in this paper a guide as practical as possible for the development of dual degree agreements. The University of Cadiz has long experience in this field, and because of this, is aware of small impairments or concerns that can appear at first. We hope that these points will help to people who want to start in this way of complement and internationalization. Double Degrees are also an undeniable value on good engineering practices. Even a mandatory in the academic offer of an Engineering Institution.

Students wishing to obtain a double degree are guaranteed to have an coordinated organization of both studies and validation system that allows the collection of titles without excessive investment of time and unnecessarily delay of their incorporation into the labor market. This will not, in any case, a waiver of teaching quality levels or knowledge requirement, but a simple reorganization of the workload.

Concerning master Programs, the double title must be accompanied by greater labor market orientation. That is, we seek to complement not only academics but also business practices or connection to research groups.

In a formal way, we can define a double or joint degree by the following:

- The programs are created and approved jointly by several institutions, studying college students, part of another university studies.
- The students of an institution must spend time studying at another institution, and vice versa. Similarly, the seasons stay in college again and should be similar.
- Studies and exams passed at the partner institutions will be fully recognized automatically.
- The student will, upon completion of the relevant studies, national degrees of each participating institution, or in some cases, a joint certificate or diploma.

In Europe, there are joint degrees in most fields of study. Matters related to economics and engineering, followed by the right and the management company are generated more usual. Also cited European studies political science, communications and media, and social science foreign languages. This type of joint degrees between European universities is usually done on the languages of the participating countries and the English language. Qualifications are more common in master's and doctoral levels more than the first cycle. The granting of a single title under various institutions is not yet widespread practice. Currently, double degrees are awarded independent national qualifications, automatically recognizing the parts of the joint programs conducted at partner institutions.

We can summarize noting that in the Bologna process, the countries involved said the joint degrees is a point of great importance to achieve almost all of the objectives of the Bologna Declaration:

- The *quality* of teaching, due to the joint efforts they have to make the organizers and participants in joint degrees. In the future all this will end in the development of an international standard for programs and the subsequent development of joint quality systems.
- *Mobility*, this is a fundamental and indispensable factor in this type of actions. We will promote the mobility of students, teachers and researchers in general.

- The *clarity* in education systems, promote joint degrees to observe the subjects from different points of view, and shape them through the curriculum. These should be as transparent as possible, and the development of these plans must be adequately justified.
- The *recognition* of activities in the generation of curricula for double degrees, it is completely necessary to establish a comprehensive mechanism for recognition of activities by the students. It is likely that the same activity is recognized differently between entities. Similarly, some countries recognize that joint degrees will require a thorough knowledge of education systems in other countries, and to work more efficiently with the ECTS credit system.
- *Labor market*, the launch of the dual degree system helps to form a European labor market more consistent and homogeneous. Our graduates are ultimately the workers of this market potential. Thus extending the concept of labor market from our country to all countries participating in the Bologna process.

STEPS TO ACHIEVING

A real case, memorandum of understanding for a dual degree program in Computer Engineering studies (University of Cadiz) and the Master in Studiengang Informatik (im Fachbereich Informatik) der Universität Koblenz-Landau.

Of course you can perform double degrees between Spanish universities, with very satisfactory results in the present work. However, to do so with a foreign university, the experience can be much more rewarding. The steps to take are as follows:

1. Contact between universities by teachers. To establish contact between universities, the factors to consider depends if we decide by a university in the same country or a foreign country. If we opt for a university in the same country, the university academic field should be our main factor to decision. The academic regulations should be rigorous and well founded. The curriculum, in line with the skills taught in the home university. Note here that similar subjects or contents does not always mean that we cannot find things to share. We can try to focus to the same area of study, watching the same concepts from different viewpoints.

If we decide to build relationships with foreign universities, the academic field is not the only factor of discrimination function we use. A foreign country usually involves handle with a different lifestyle. Different laws, and using a new language to communicate with others. Function in a new city. These are also factors that influence the formation of the students. Mobility should be a stimulus for students, not a decrease.

2. Previous experience within the framework of Socrates / Erasmus, or general study abroad programs. In each college, there are people who have the most contact in international relations. They are the Erasmus coordinators, so you can go and ask them about the foreign Institution. Of course Internationalisation is not just Erasmus. We have also Alfa, Mundus, Tempus, projects with African universities, and defined projects with foreign universities in general. Any previous related experience is valuable information that you can reuse.

In our particular case, once the two professors have been known, the source Institution professor reports to the international relations office about experience between the University of Cadiz and the German universities. We confirm that they are serious and hard working people, and although no previous relationship with the university destination (Universität Koblenz-Landau). There are relationships and agreements with a significant number of German universities. Unfortunately not always the case, moreover, these prints can vary depending on the subject matter, science, engineering, humanities

3. Visit among faculty coordinators. These previous visits are conducted to study the curriculum and the teaching thereof. We should also observe and study the general lifestyle in the country of destination (Language, accommodation, communications ...). If it's possible the responsible for establishing dual degree should travel and learn firsthand about the environment in which visiting students will be in the future. It is very difficult to know something so complex and so rich only of others and the help of internet.

During the visits, it is convenient to have a travelogue in which are saved all scoring factors for the choice of the university as a partner in cooperation. Of course, academic excellence is our main goal, which is greatly enhanced by other aspects of everyday life. So the students provide integrated training for the workplace in particular and life in general. Scoring factors are:

- Curriculum and academic structure of the university destination. It is our cornerstone, which will be addressed later in this paper. By now we can say that if there is incompatibility between universities material, this should be detected and can be enough reason to stop the develop of a double degree.
- Foreign Language. In most cases, stay in a foreign country involves learning and improving the language of the destination university. In this case we find the use of a language important and necessary in the study area we are working. We should note that the visiting student must attend classes and exams in the language of the destination university. Although in many cases allows the use of EU official languages. The European Union has aprox. 20 official languages.
- Student life in the campus. We find that our students are well accommodated and cared for. A good university housing system by insertion into families can be crucial to the welfare and the right environment for the study. The fate of our example university has a wide network of accommodation for visiting students. Housing and accommodation system, shared residences or just renting floors are easily accessible and affordable for students. However, in this case Spanish university was lower than desirable, a factor that did not matter too much to college destination, as there was a trend to improvement then materialized.
- Care and Infrastructure for foreign student. As we all know, small classes and specialized care by the coordinators are very important to optimize the time of visiting students. good management deliver the students to lose a lot of time informing and asking the same questions that their peers did in previous years. For this, the destination university should have good international relations office. Where fellows to help the depth details visitors.

- In addition, the coordinator or the person responsible for a double degree in college destination must be approachable and understanding. In fact, should be the person who made the trip to the other university, to know in detail the origin of the visiting student city and the idiosyncrasies of the place. We should emphasize at this point that the lines of communication between universities should be consistent and well defined. A coordinator (or a student) from a university, you must know clearly who to contact to raise a particular issue. For double degree presented here, the college coordinator responsible destiny had previous experience of building relationships with other Spanish universities, knows the Spanish lifestyle and many cities of its geography, as well as a more than desirable language Spanish. For this part of the score given was the maximum possible. Minor was the previous experience and knowledge of the language of the official Spanish university. Problem solved subsequently also by new foreign trips and intensive learning German.

It is also desirable and scoring facilities with which the student will visitor. A well-equipped campus, and access to library and computer. Enough infrastructure, and a wide range of cultural activities are elements that help students stay on. Do not forget to live in a foreign city we provide cultural knowledge about the country in which we find ourselves. Here we find the greatest discrepancy between universities, as the German university campus had a new and excellent, while Spanish was developing.

- Communications. Here we discuss communications both from the origin city to the destination city, and within the destination city. There have been cases in the past where the visiting students had to live in cities other than their schools, which give us a lack of attendance. We avoid this and bring home as much as possible to the college. Students mainly go to study, not tourists. We find international airports nearby cities and countries with good lines of communication.

4. Comprehensive comparison between the different curricula. We are in the most important decision-point. We spend as much time as needed to compare the different curricula among universities. As discussed above, the academic factor is the most important in establishing these relationships. Not to establish joint degrees meaningless, because it is counterproductive for the student, if it finds that a high percentage of their knowledge never put into practice in the workplace. It is necessary to confront and study the subjects taught and the timing of them. Seeking to balance an equation will result in the training of the students to play a good role in the company. The individuals responsible for this study must have a complete knowledge about the subjects under study. The credit load must be distributed in a reciprocal manner in both universities.

EPILOGUE

Practical bases have been presented, the previous aspects, and the methodology to generalize and disseminate the concept of establishing joint degrees in universities under the challenge of the EHEA and Engineering Master Programs. First, citing prior knowledge and background, we provide goals subconscious way we should look at all times in such collaborations. And secondly, by showing the numbered steps from any starting point, and primarily motivated by the improvement in the training of

students, we can develop mutually satisfying relationships. It is relatively easy to fall into other incentives in establishing these relationships, sympathy with the destination country, playful nature of travel, foreign language practice, or labour market. However, those here presented should be our goals to make this task not a waste, but an investment.