Industry Certificate Courses Enhance University Experts and Masters

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Resumen

Industry certificates are quite different than the university postgraduate courses, especially from university experts and masters. While there is a common thought that the knowledge level of the industry certificate courses is low compared with university postgraduate courses, our experience demonstrate that with a good curricula plan they can coexist in university official and unofficial courses achieving great success. In this paper, we show how we have included several industry certificate courses in three university titles (an expert certificate, an unofficial master and an official master) and how they have made these titles very demanded by the students. We will show how the inclusions of industry certifications affected to the number of registered students and how confident are them for developing professional skills.

Introduction

In engineering education, the traditional approach of placing emphasis on teaching theory and analysis while relying on industry training for grasping synthesis, developing practical skills, and understanding the enterprise no longer accommodates industry needs. Engineering science must be complemented by engineering know-how. Moreover, attention must be focused on Engineering design, teamwork, critical thinking and effective communication skills. This shift is renewing the vitality of engineering education and is challenging educators to prepare students for a more competitive working environment. Therefore, university-industry collaboration is a key factor for success in providing effective postgraduate learning engineering Masters (Bengiamin et al., 1998).

The traditional engineering Master´s program is a collection of independent advanced-level courses. However, the Master must be organized in a way that it meets the industry strategic needs and it is consistent with the mission of university. The students must develop skills to manage technology and technology change and a systematic and analytic framework to support decision making (Chelst et al., 1998).

Several authors reported their experience in university-industry collaborative masters (Chelst et al., 1998; Dunn-Rankin et al.,1998; Jiménez et al. 2004; LLoret et al. 2007). They highly recommended these Masters to bring faculty members and students together into industry interaction as a part of engineering education. Dunn-Rankin et al. 1998 found that

students and faculty rarely have the opportunity to take a real problem, extract its essence, apply an analysis and then make design decisions based on this analysis. To overcome this lack of appropriate design training in engineering, they organized a Master organized based on an actual project considering the following steps: identifying technical issues, formulation solution methodology, developing alternative solutions, evaluating alternatives, formulating revised solutions plans and selecting the final design recommendation. Chelst et al. 1998 defined an Engineering Management Master´s program to target the working engineer on the path to technical leadership. Both faculty members and engineering managers from industry worked together to teach high potential engineering leaders. LLoret et al. 2006 proposed the following learning methodologies to develop the capabilities and abilities needed in an industrial environment: discovery learning (real-industry problems are solved by students themselves with the professor guidance) (LLoret et al. 2004a), collaborative learning (students interact with each other to find the solution to a real-industry problem) (LLoret et al. 2004b) and case of study. In this way, Hutchings (2009) illustrated how collaborative (academic and practitioner) case studies positively influence student perceptions of the profession, as well as better prepares them for the challenges they will face in their careers.

Lamancusa et al. 2008 proposed an industry-patterned active learning to produce engineers who could be immediately useful to industry. They called it Learning Factory. In this Factory multidisciplinary student teams developed engineering leadership skills by working with industry to solve real-world problems. The learning factory provided strong collaborations with industry through: advisory boards, engineers in the classroom, industry sponsored design projects, courses integrating analytical and theoretical knowledge with manufacturing, design, business concepts and professional skills.

The contribution of industry personnel to university teaching and supervision brings several important benefits to a Master's programme (Ronalds, 1999):

- Students are attracted to the programme because they see industry endorsement.
- A mix of academic and industrial experience helps ensure the relevance and currency of the course material.
- In supervising projects, companies give students instruction in the use of state of-the-art facilities. Students enjoy working on problems that are of clear interest to the industry.
- Industry is aware of the skills required in the workplace, both technical and generic (report writing, presentation, teamwork, creative thinking, decision making), and naturally build these skills into the learning process.

Industry Certificate Courses

Industry certification (also known as professional certification) programs are focused on developing the skills and knowledge of a person to perform a job or task. They are certified by an Information Technology (IT) vendor, a trade organization or a professional society by a nominal letter. Generally, they are valid only for a specific period of time, so these certificates must be renewed periodically. Professionals interested on having these certificates should be always learning the new technologies, versions of the software programs or even know the appearance of new standards in order to pass the continuous increasing version of the certification exam. We can distinguish three main types of certifications:

- Those ones that do not depend on the company’s definition of a certain job (also called profession-wide). They provide a professional knowledge and experience to the persons.

- Those ones that directly depend on specific IT vendor products or tasks. They provide how a product or task can be used or managed, but they are internal of a corporation, and can only be achieved by their personnel.
- Those ones are intended to be referenced to a product across all applications or to a specific job with some defined tasks. It uses to be very common in IT industry where personnel should be certified on a version of software or hardware.

The always changing employment market made a quick growth of the industry certification. There are many types of certifications in many industrial sectors such as technology, construction, aviation, health care, business, finance, etc. Although some of these sectors have a society that regulates their certification, there are several well known licensing and IT certification exam providers with thousands of test centers delivering millions of tests around the globe each year (VUE, 2013) (Prometric, 2013).

In this paper we show three study cases where several industry certifications have been included in the university course program. We will show how the addition of this content affects to the interest of the students in the university title programs and also how the students take profit of this knowledge in their professional skills after finishing them.

Study Cases

Our study cases include a university expert certificate, an unofficial university master and an official master. Because the university expert certificate is included in the unofficial university master, we will only analyze two study cases: the official master and the unofficial master.

Official Master

Our study case is the Official Master's Degree in Digital Post Production (MUPD, 2013). It has 19 subjects. Along the years we have included several industry certificates. Concretely, these certificates have been “AVID”, “Adobe After Effects”, “Protools”, “Apple Logic Studio”, which contents have completely been included in different subjects. All potential students know that these certifications are taught in the master, so along the years it has caused to increase the number of registered students in the master although many other masters have decreased their number. Figure 1 shows the number of students interested to be registered in the official university master in four teaching courses. In the year 2009-10 there was not industry certification included in the master. In the year 2010-2011 and 2011-2012, there were two industry certifications included. In the year 2012-2013 we had three industry certifications included in the master

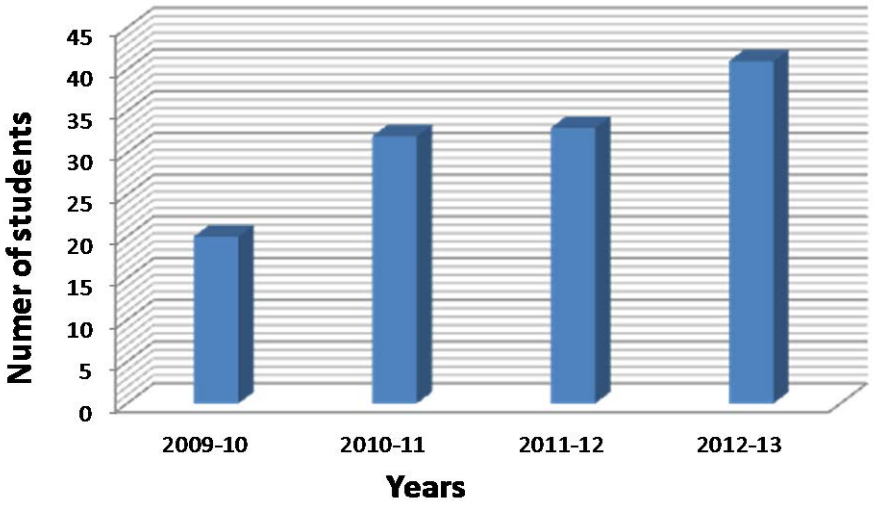

Figure 1. Evolution of the number of students in the official master along the years.

Unofficial Master

Our study case is the unofficial master "Redes y Comunicaciones de Ordenadores, Tecnologias Web y Comercio Electronico" (EURCO, 2013). The university expert "Redes y Comunicaciones de Ordenadores" was created in 2008 and it, jointly with the university expert "Tecnologias Web y Comercio Electronico", formed the unofficial master. In this case all subjects include industry certificate contents. Only the first year had contents proposed by university lecturers without industry certifications. Figure 2, shows this evolution. We can see that compared with the first year, the master has experienced an increment of 86% in one of the years.

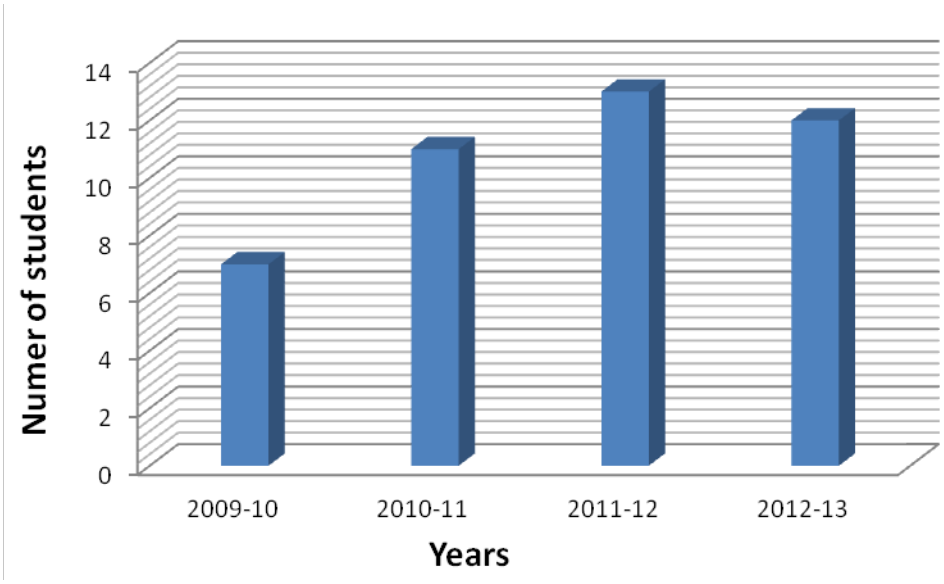

Figure 2. Evolution of the number of students in the unofficial master along the years.

In order to know the benefits provided by industry certificates to our students, we have performed a survey to all students in the last course. Table 1 collects the information gathered.

We have observed that all marks provided by the students are 5 or 4, providing in all cases a mean value higher than 4.33 out of 5. Overall, students are very or completely confident in the acquired knowledge, satisfied or very satisfied, and very enthusiastic or completely enthusiastic because of the type of course. Moreover, students consider that the industry certificate will help to find a job.

Question 1	**Rating**					**Median**
	(1) Not At All Interested	(2) Slightly Interested	(3) Interested	(4) Very Interested	(5) Completely Interested	
Please indicate your interest in this course:	0	0	0	5	7	4.58

Question 2	**Rating**						**Median**
	(1) Not At All Confident	(2) A Little Confident	(3) Confident	(4) Very Confident	(5) Completely Confident	Prefer Not To Answer	
Please rate how confident you feel in your overall ability to design and maintain networks after finishing this course	0	0	0	7	5	0	4.42

Question 3	**Rating**						**Median**
	(1) Strongly Disagree	(2) Disagree	(3) Neither Agree Nor Disagree	(4) Agree	(5) Strongly Agree	Don't Know / Not Applicable	
Please rate how much you agree with the hands-on lab activities included in this course (that helped you to achieve the stated course objectives.)	0	0	0	6	6	0	4.5

Question 4	**Rating**					**Median**
	(1) Very Dissatisfied	(2) Dissatisfied	(3) Neutral	(4) Satisfied	(5) Very Satisfied	
Please rate your level of satisfaction with the course as a whole:	0	0	0	8	4	4.33

Question 5	**Rating**					**Median**
	(1) Not At All Enthusiastic	(2) Slightly Enthusiastic	(3) Enthusiastic	(4) Very Enthusiastic	(5) Completely Enthusiastic	
Please indicate how enthusiastic you are about the content of this course and the things you're learning (or have learned):	0	0	0	5	7	4.58

Question 6	**Rating**							**Median**
	(1) Not At All	(2) A little	(3) Somewhat	(4) Quite a bit	(5) Very Much	Don't Know / NA	Prefer Not To Answer	
Relevance to Goals:								
To what extent did this course help you:								
Prepare for Certification exam(s)	0	0	0	5	5	2	0	4.5
Learn skills that can be used in your current or a future job	0	0	0	5	7	0	0	4.41
Increase your value in the job market	0	0	0	3	9	0	0	4.75
Obtain a new job or advance in your current job	0	0	0	2	8	2	0	4.8

Table 1. Survey performed to the students in an unofficial master in the last course.

Conclusion

We have seen along the years that to include industry certifications in the university curricula (especially in the university experts and masters), make the students more confident with their professional skills while they acquire more practical knowledge on existing industry. The fact of including industry certifications increase the interest of the students in these the university experts and masters because the number of registered students have been increased along the years.

Industry certificates do not decrease the level of the content of the subjects because the contents are taught by lecturers from the university, which can provide an in-depth explanation and increase the technical and theoretical content when needed.

In future works we are going to compare the evolution of official and unofficial masters with industry certificates with official and unofficial masters without industry certificates in order to show which ones attract more students and which ones let students find a job more easily when they finish their studies.

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Cuestiones y/o consideraciones para el debate

Are we helping vendors to sell their products when we use their courses in the official and unofficial masters?

Should industry certificates only be included in unofficial courses, but not in official courses? Should industry certificates be included in official courses (although it implies to be only using a specific device or software from that vendor)?

How many industry certifications should be included at maximum in order to have other courses including contents not decided from the vendors but from the academia?