Adjusting Higher Education Competences to Companies Professional Needs: A Case Study in an Engineering Master’s Degree

Joaquim Alves, Research Centre in Industrial Technology and Engineering, Polytechnic of Porto, Porto, Portugal
Natércia Lima, Research Centre in Industrial Technology and Engineering, Polytechnic of Porto, Porto, Portugal
Gustavo Alves, Research Centre in Industrial Technology and Engineering, Polytechnic of Porto, Porto, Portugal
Francisco J. García-Peñalvo, Research Institute for Educational Sciences, University of Salamanca, Spain

ABSTRACT

This work reports the incorporation result of a Work Integrated Learning (WIL) Program in the two-years master’s degree in Instrumentation and Metrology Engineering (MEIM) held at the School of Engineering, Polytechnic of Porto (ISEP). The procedure developed to find internships in industrial companies and institutions, which have needs for engineers in the areas of instrumentation and metrology is displayed. The authors also present the information on the situation of students that, by the end of the first academic year, could get enrolled in the curricular unit Dissertation/Project/Professional Training (opting either for a professional internship in a company or by a research project conducted in ISEP laboratories). In order to understand the benefits and impact of a WIL program, from a student perspective, students were asked to answer a questionnaire. Lastly, the results achieved during the study period are presented, including the student reported outcomes (from the questionnaire), as well as the informal feedback from students and companies’ supervisors. The good results achieved, regarding the development of theoretical-practical competencies as well as generic or soft skills, during the master’s, were also confirmed by the fact that students are hired by the companies to continue their work after the end of professional training.

KEYWORDS

Competence Development, Engineering Education, Learning Outcomes, Learning Strategies, WIL Programs

INTRODUCTION

Within higher education, mainly amongst the most prestige universities, it almost seems criminal to mention higher education and employment in the same conversation, as the role of higher education is not vocational (Freeman, 1997). However, one of the desirable outcomes of a higher education degree is the transition to the labor market, with the expectation of a worthwhile career, one that guarantees a higher social status and allows for a higher income than non-college graduates (Watts, 1983). The need to reduce the current gap between higher education and the demands of labor work has, in these last years, stimulated several studies (Handel, 2003), as it is imperative that there must be an information exchange between these “two worlds”, as all countries/governments are concerned about their return in higher education investment (García-Peñalvo, 2011).

In a market economy it’s of crucial importance that there is an effective information exchange between higher education and the labor market, so that higher education institutions can be shaped, by the demands of the market. The need for employers to be involved in curricular design has been
discussed by several authors (Diamond, 1989) as, economically speaking, employers are the consumers of the product (students) of higher education institutions. In a perfect world, this information exchange should lead to a matching of job skills between graduates and employers (García-Peñalvo, 2016). A mismatch of these could lead to unemployment or underemployment of expensive educated graduates, which is economically inefficient and personal distressful (Fulton, Gordon, & William, 1982).

Although employees generally agree that graduates have solid theoretical-practical knowledge in their field of specialization, they are less satisfied with the development of what have been termed “generic skills”, such as communication, team working, time management, problem-solving and learning aptitude and the ability to manage stress and heavy workloads (Stiwne & Jungert, 2010) (Hernandez-March, Martín del Peso, & Rabadán, 2010) (Froyd, Wankat, & Smith, 2012). As Al-Bahi et al. states, Engineering Students are expected to have, at the end of their university/polytechnic degree, “a set of professional skills related to teamwork, oral and written communications, and impact of engineering solutions, life-long learning and knowledge of contemporary issues.” (Al-Bahi, Taha, & Turkmen, 2013). It is hoped that higher education provides workers not only with the adequate knowledge in their field, but also with the necessary abilities and competencies to carry out their job assignments, ultimately to maintain and improve their country’s social well-being and economic prosperity.

Moreover, with the democratization of education it is expected that higher education institutions have to accommodate a position where students are more diverse in their background, motivations and capabilities as well as in the jobs and positions that they will have after graduating (Teichler, 1999; Michavila et al., 2016). Furthermore, some employers feel that recent graduates exhibit a different attitude and behavior when compared to previous generations – they have a certain lack of motivation and maturity, putting high priority on comfort, their personal life and free time. This has essentially to do with the fact that new generations (sometimes described as the “Peter Pan Generation”) have grown up in a rather protected environment, having almost everything they wanted without having to make much effort to get it (Hernandez-March, Martín del Peso, & Rabadán, 2010; García-Peñalvo et al., 2016).

So, in higher education institutions, there must be a change in the learning-teaching methodology as well as in the content of syllabi, including infusion of student outcomes into curriculum, which would allow students to develop these generic skills (García-Peñalvo, Cruz-Benito, Griffiths & Achilleos, 2015; 2016). Still, teaching and assessing these skills is very difficult. Atkins (Atkins, 1999) states that these skills can also be developed by other means: students living away from home, studying abroad, summer work, through “gap years”, by participating in clubs and societies or by undertaking voluntary activities. These statements are supported by many students.

The inclusion of Work Integrated Learning (WIL) programs – labor practices in companies, undertaken by students, subjected to academic supervision and coordination – in the study plan of higher education institutions is becoming a generalized response to these challenges (DEST, 2001). This term is being used by universities from all over the world to identify programs that add a practical employment-based learning component to school-based learning. WIL Programs are most valuable because they align theoretical classroom learning with practical workplace (Kramer & Usher, 2011). Alternatively, to universities, higher education polytechnics schools started this practice throughout Europe in the mid-60s (Kehm & Teichler, 1995). Some authors state that WIL Programs are the most efficient means to develop competencies in graduates (Ellis, 2000) (Gault, Redington, & Schlager, 2000) (Braunstein & Loken, 2004) (Bennet, Eagle, Mousley, & Ali-Choudhury, 2008) and students confirm that “a thesis project in a firm was the best learning experience during the whole period of studies” (Stiwne & Jungert, 2010). However, it remains unexplored the comparative benefits of this program to other types of student work experiences (Kramer & Usher, 2011).
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