

Engineering Education And It's Impact On Young Graduates Employability From Students' Point Of View

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Abstract

Since 1995, Board of European Students of Technology (BEST) perceives students as one of the major actors in the development of education. In this way we have been striving to bring the development of European Engineering Education (EEE) closer to students. By organising events on educational matters we bring students' opinion into the spotlight to meet both their, academics' and industry's needs.

Through our work and services we have learned that currently there is a gap between employers' needs and the skills and knowledge provided by the universities, where freshly graduated students lack skills that are necessary for them to perform in company environment. Students' input collected in several Events on Education has identified various opportunities to bridge this gap, such as extra-curricular education, soft skills development, volunteering and international exchange programmes.

The Majority of these opportunities, however, are not included nor recognised in most curricula. In this way the work of organizations like BEST is important to enhance students' employability, as we work to develop students' extra-curricular education and promote soft skills, thus improving students' curricula. It is also important to point out the role of BEST in students' involvement in EEE and in the recognition and accreditation of soft skills.

For the sake of future generations of engineers, BEST is willing to spark a debate with our key stakeholders (students, universities and companies) to ensure a holistic approach towards the development of engineering students' curricula.

1. Introduction

To the present day students are being perceived as major actors in the development of educational systems. However, despite their significant role, students are not as involved in shaping their education as it would seem necessary. Student's limited input on European engineering education made it possible to recognise a gap between employer's needs and skills currently provided by universities. In fact, in 1998 Duyen Q. Nguyen supported that exposing engineers to non-technical study areas would broaden their skills and knowledge thus increasing their job prospects by better meeting industry's requirements (Nguyen 1998). Moreover, recently, Professor M.S Rao said that soft skills can bridge the gap

between university and industry among engineering students, thus enhancing their employability (Rao 2014) and also called soft skills as employability skills necessary to start a career (Rao 2011). Unfortunately, soft skills are not included nor recognised in most curricula.

BEST is a constantly growing non-profit and non-political organisation, consisting of 96 technical universities, involving more than 3300 technology students as members and reaching more than 1'300'000 technical students throughout our activities. We strive to develop students by providing complementary education, educational involvement and career support, as well as to achieve the vision “Empowered Diversity” in a general context by bringing students, academia and industry together through various services.

As an organization that aims to enhance students’ soft skills development, BEST has also recognised the gap between employers’ needs and skills and knowledge that can be acquired at university. Therefore, since 1995, BEST assumes an important role in the involvement of students in their education, hence striving to bring students’ opinions into the spotlight of European education in order to meet both their needs and the needs of academics and industry. Thus, in this paper, we want to report the impact of Engineering Education on young graduates’ employability from a students’ point of view.

2. Gap between employer needs and skills provided by universities

As previously stated, BEST strives to involve students input in the development of education - both in their local universities and in EEE. We have been developing methods to gather students’ input and disseminate it through the EEE discussion groups and networks, as well as organising events on educational matters around Europe, approaching both global and local issues. One of the areas we worked on, in order to gather students’ input, was the impact of engineering education in young graduates employability, through which we have learned that there is a gap between employers’ needs and the skills and knowledge provided by the universities.

The process of identifying the gap was based on gathering students' opinion in different topics during Events on Education (EoEs), that are divided in two types. One is BEST Symposium on Education, where students are given the opportunity to express their ideas on educational matters through discussions with professors and other experts. A Symposium lasts usually 7 days and involves approximately 25 students, BEST members, representatives from European educational projects and representatives from universities. The other type of EoEs is BEST Academics and Companies Forum (BACos), which are very similar to a BEST Symposium on Education. However, unlike Symposiums on Education, BACos additionally contain a dynamic collaboration with companies, having the goal to approach the perspectives of the three stakeholders in education (students, companies and universities) through the continuous exchange of opinions and experience.

Several EoEs happened throughout the years, approaching different topics which overall provided us with students' point of view on the impact of engineering education in young graduates' employability. For instance, BACo Rome Tor Vergata 2005 approached the topic of ““The Role of Extra-Curricular Activities in the Formation of Engineers””, BACo Istanbul 2006 approached the topic of ““Accreditation, learning outcomes and the role of extra-curricular activities in the formation of engineers.””, BACo Sofia 2010 approached the topic of ““Transition from studies to your first job””, and Symposium on Education Aveiro 2013 approached the topic of ““Accreditation and attractiveness in engineering””.

Furthermore, we have been providing involvement and feedback from students on the topics within different Thematic Networks (TNs) scope that seek to develop the European dimension of engineering education and improve its quality. BEST has played an active role in such TN's as EUGENE, EU-VIP, TREE (Teaching and Research in Engineering in Europe) and we are currently involved in PRO-VIP (Promoting Virtual Mobility in Placements), a project financed by the Lifelong Learning Programme. Within this project we have organized BACo Timisoara 2013 which aimed for students' input on the topic of ““virtual internships and entrepreneurship””.

Moreover, BEST annually organises European BEST Engineering Competition (EBEC), a competition aiming to promote students opportunity to apply their technical knowledge and to develop their soft skills (Enea et al 2011). Therefore we collected information about the influence of students' participation in EBEC on their attractiveness for future employers by surveying participants of EBEC Finals 2011 in Istanbul and 2012 in Zagreb (Stepisnik et al 2013).

3. How to bridge the gap and enhance employability

Throughout the years, members of BEST have identified various opportunities to bridge this gap, by means of discussions, workshops in our internal events, and their own personal experience when regarding their curriculum and employability chances. For instance, extra-curricular education, volunteering and international exchange programmes are some of the opportunities that members of BEST, as students and future engineers have identified. Other opportunities have also been recognised by gathering students' input on the topic, and can be found within the outcomes of the different EoEs (Symposium or BACo) and within the EBEC survey, as forwardly mentioned.

BACo Rome Tor Vergata 2005

BACo Rome Tor Vergata was held between the 26th July and the 1st of August 2005, and had the main topic of "The Role of Extra-Curricular Activities in the Formation of Engineers". In this BACo its main goals were to analyze the role of extra-curricular activities in the formation of engineers, and how to integrate this topic in the European higher-education system. People involved in this BACo were students from 14 different European countries and teachers from TREE. Students concluded that a diploma was not enough for employability, and that recognition of some extra-curricular activities is necessary as both practice and experience are needed besides formal education. The recognition of these activities would be used to provide documentation for future employers, and to increase student's motivation as well as their options to customize the University experience.

BACo Istanbul 2006

BACo Istanbul happened from the 27th February until the 5th March 2006 and it approached the topic of “Accreditation, learning outcomes and the role of extra-curricular activities in the formation of engineers.” Participants from 12 different countries not only agreed that in engineering education grades are not always indicative of the level of knowledge or ability to act as an engineer but also that what students learn in universities is not enough to be an engineer. In this way, participants concluded that soft skills are indispensable for the profile of every engineer and they vary accordingly to students’ personality. Moreover, it was concluded that companies should get more involved in university programmes as they could provide activities to fill the gap between universities’ and companies’ needs.

BACo Sofia 2010

BACo Sofia was held between the 20th and 28th of August 2010. This event counted with participants from 14 different countries and it focused on discussing internships, mentorship and their importance for students development. All entities involved considered that internships provide students with the chance to turn the freshly acquired theoretical knowledge into practical experience, thus shortening the intellectual gap between the university life and the working life. Throughout the event, participants highlighted the importance of internships and mentorship to shape one’s curriculum to future employer’s needs. Internships not only give a valuable insight into the corporate and industrial working-methods to students, but also contribute to adapt the students’ mindset to something closer to their future needs. Mentorship, on the other hand, is a helpful tool by which future engineers can take the most advantage of their graduation years, and develop themselves the most.

BACo Timisoara 2013

BACo Timisoara took place from the 14th to the 20th of July 2013 and involved participants from 11 different countries. The main topic approached in this event was “Bringing Education and Entrepreneurship under students’ scope” and it focused on two

subtopics: Virtual internships (within our involvement in PROVIP project) and Entrepreneurship. Participants agreed that getting an internship generally leads to a job later on as they also develop some soft skills such as communication skills, networking, and time management, thus consisting in one of the tools to bridge the gap and enhance employability. It was also concluded that virtual internships should promote the interaction between stakeholders (universities, students and companies) thus finding a way to meet everyone's needs.

Symposium on Education Aveiro 2013

In the past year, Symposium on Education Aveiro, happened from 30th of August until 8th of September 2013. This main topic of this event was Accreditation and attractiveness in engineering” and involved participants from 13 different countries. This symposium aimed to find out and help to improve the attractiveness of engineering education and engineering in general but also to develop ideas for the accreditation of useful soft-skills that are needed in future careers. Participants concluded that by having “soft skills” in addition to the “hard skills”, the employability of students is increased and that nowadays employers are looking for soft skills in addition to the standard qualifications. Students also concluded there should be a supervision system including all the stakeholders which would evaluate and supervise the university curricula in order to ensure both its quality and that the needed standards are met.

EBEC Finals Survey

The survey was conducted on EBEC Finals 2011 in Istanbul and 2012 in Zagreb, and rested upon two main topics: which skills students developed during the participation in EBEC, and what were the reasons why students’ participated in EBEC. Through this survey we learned that interest of academics, industry and students greatly overlap in the course of EBEC. Besides that this survey made us acknowledge that the skills required by the industry are acquired or improved during students’ participation in engineering competitions. This emphasizes the role of EBEC in students’ curricula development. This research has proven that participating in engineering competitions is significantly

increasing students' non-technical skills required by their future career, as well as student awareness of soft skills importance.

4. Conclusion

The main conclusion BEST achieved by gathering students' input was that there are several opportunities to bridge the gap between employer's needs and the skills and knowledge provided by education. For instance, extra-curricular education, the development of soft skills, internships and mentorship were some opportunities that students identified. Volunteering and international exchange programmes have also been considered as opportunities to enhance employability, especially when taking into consideration BEST members' own experience, as they are also students and engineers of the future.

In this way the work of organizations like BEST in the development of students' extra-curricular education and promotion of soft skills is an important tool to improve students' curricula, thus enhancing their chances of employability. It is also important to point out the role of students' involvement in EEE in the recognition and accreditation of soft skills' in young engineers' curricula. Therefore the role of organizations like BEST in promoting students' involvement in EEE becomes important as well.

Freshly graduated students lack skills that are necessary for them to prosper in company environment, and if those needs won't be assessed and responded to, the gap will become larger as the industry develops while engineering curricula remain unchanged. In the future, BEST is willing to spark a debate with our key stakeholders (students, universities and companies) to ensure a holistic approach towards the development of engineering students' curricula, for the sake of future generations of engineers.

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