INTERNATIONAL TECHNICAL ORGANIZATIONS – IEEE AND BEST – AS OPPORTUNITIES FOR A CAREER DEVELOPMENT AND GAIN TECHNICAL EXPERIENCE OF STUDENTS

Katarzyna Baran

Institute of Computer Science, Lublin University of Technology (POLAND)

Abstract

In the age of modern technology and search for innovative solutions to technical problems, engineering education plays an important role. Supporting students in technical development, equipping them with specialized knowledge and skills is a key task for university and companies. Therefore, universities often offer a variety of internships and international exchanges. However, that involves time, financial or attendance constraints. Technical organizations allow students for flexibility in gaining professional experience during the study. International technical organizations such as IEEE and BEST are an incredible opportunity for students to become involved in technical activities internationally. BEST (Board of European Students of Technology) brings together technical students from 32 European countries. Since 1989, help students with international communication, cooperation and exchange opportunities. One of purpose is the formation of a new generation of Euro-Engineers. Priority is to offer high quality services and bring all partners in the “student-company-university” triangle closer. BEST organizes conferences and meeting, engineering competitions, and executes projects such as: academic courses abroad, internships. IEEE is the largest professional technical organization for people all world. For students, IEEE offers to create branches on the universities, which is a join to the community of technology and engineering professional, participation in conferences and workshops, publications in scientific journals, access to network platforms and educational programs. Affiliated with an IEEE engineer is value for employers. IEEE helps with a career.

In this paper, the author presents the international technical organization IEEE and BEST, explain their role and importance for gaining experience and career development of a student. Then describe the research, participants were students and PhD students who are members or non-members of international technical organizations (90 students). Research shows that over 92% of students consider international organizations as a source of experience and a great start to career. The strengths are: contact with specialists, transfer of knowledge and access to news, possibility to participate in various programs, courses and practices. 95% indicated that their participation in IEEE / BEST facilitated their technical career and gained experience. 87% plan to continue to participate in the organization in the future. The most attractive form of exchange of experience in these organizations is: workshops and branch (55%), conferences (41%).

The creativity, professionalism and openness of international technical organizations is conducive to the development of the science-student-work relationship.

Keywords: technical, organization, international, IEEE, BEST.

1 INTRODUCTION

International student organizations are associations for students from many countries who are looking for more than theoretical knowledge at the university. Some of the knowledge gained from lectures or exercises may be superfluous in post-student life, especially in the field of engineering. Thinking about future work, the student should take care of his personal development and stand out in the labor market. Traditional traineeships, student internships may not be enough. Therefore, it is worth thinking about participating in international technical organizations that will significantly enhance the Curriculum Vitae (CV). Student organizations are primarily new people, constant interactions, team working, collaboration and exchange of ideas. These elements are visible especially in the implementation of many projects of the organization. During the projects, students will improve not only the technical knowledge and skills, but also the personal skills that are so often sought by employers. In addition, they develop soft skills, or psychosocial skills related to personality traits [1]. Members learn responsibility for their own work and teamwork. They will know their strengths and weaknesses that they should work on. Work at a high position in companies or technical organizations, often requires managing technical professional [2]. Looking at organizations through the
prism of internationality, it is important to exchange experiences, build relationships despite the differences of cultures, the prospect of foreign practices and even work, international workshops, conferences, and projects. Communication within the technical organization is an important issue. Identifying key communication factors and incorporating them into the change process can help get the benefits of change [3]. The experience gained in the organization proves to be valuable in the context of future employment because it increases the attractiveness of the candidate in the labor market. Organizations equip a member with what universities cannot provide. According to [4] students engaged in technical organization are almost 50% over more likely to pursue a technical career. The activity of technical organization is not only teamwork, human and project management, foreign trips and contacts with specialists. It is primarily the transfer of technical knowledge and the concentration of professionals in the field of engineering. Organizations such as IEEE and BEST not only focus on the personal development of members through, for example, the organization of training in presentation art, negotiation, but above all a solid technical presence around the world.

2 TECHNICAL ORGANIZATIONS FOR STUDENTS – IEEE AND BEST

The world of dynamically developing technology should be based on specialists in technology, innovative solutions to technological problems, international cooperation, the transfer of knowledge and skills, and a common space of action. To be a part of this technical world and to bring something new, it is worth to use IEEE or BEST. These organizations are truly a professional technical space, providing an amazing start to a student's career.

2.1 IEEE and BEST – their role

IEEE (Institute of Electrical and Electronics Engineers) is a global and professional non-profit organization that is actively involved in the advancement of science in the fields of electrics, telecommunications, computer engineering and other related [5]. Promotes modern solutions in biomedicine, nanotechnology, aviation and more. IEEE has a dual structure: regional - regions and national sections, technical - Societies, Branches and Councils [6]. IEEE brings together science-industry professionals. It publishes around 30% of the world's top-level thematic literature with a high Impact Factor. There are several types of membership. For students, postgraduates and young engineers, IEEE offer Branches and YT groups (Young Professionals). Thanks to these forms, members receive some privileges. For example: access to technical literature, conference discounts, publication of your own work, mentoring, sponsorship of branch meetings and more. IEEE also defines educational standards through expert actions and publications of various reports. Examples of this may be Computing Curricula [7], as defined by the IEEE in association with ACM (Association for Computing Machinery) and used by universities to develop programs [8].

BEST (Board of European Students of Technology) is an international, non-profit student organization. It is made up of members of technical colleges from 33 European countries. Since 1989, BEST organize a variety of events to provide students with the opportunity to enter the international environment, to establish contacts, strengthen cooperation between European higher education institutions, have fun and improve languages. The organization consists of three structures: local, regional and international [9,10]. BEST structures often organize thematic contests, scientific seminars, and competitions, such as the EBEC (European BEST Engineering Competition). BEST operates within 5 committees: EduCo(Educational Committee), ITC(Information Technology Committee), EEC(External Events Committee), markeTeam(Marketing Committee), finTeam(Financial Team) [11]. Membership gains:

- visiting companies (often industrial), research institutions,
- participation in international project enables to increase knowledge – technical, cultural, social,
- gaining new contact and experience which may (in future) affect to better job offers in all Europe,
- high quality of the offer directed to students – a lot of events, training at the international and local level.

One of purpose is the formation of a new generation of Euro-Engineers. Priority is to offer high quality services and bring all partners in the "student-company-university" triangle closer.

By analyzing the organizations – IEEE and BEST, can conclude that it is a spectrum of unlimited possibilities. IEEE and BEST support:
- basic and advanced technical education,
- cooperation in a multicultural environment,
- development of soft and hard skills (and their use in everyday life),
- development of creativity, communications skills, overcoming weakness,
- transfer of knowledge between professional, experts and students from around the world,
- gaining knowledge and supporting members success,
- student development.

### 2.2 Students experience and career development

The concept of "career" is associated with students most often with development (personal and professional), the pursuit of the goal, the expansion of interests and skills, self-fulfillment, satisfaction with work and success and promotion. Career development is the lifelong process of work, managing learning, leisure. It evolves future [12]. Career requires a very important element. Namely - gaining experience and new qualifications. Students can gain experience by starting as a research group, student government or volunteering. Also internships and international exchanges are a very good opportunity to gain additional experience but do not exhaust the all possibilities. One of the best possibilities to gain practical experience is to combine work and study. Lublin University of Technology has realized series of projects that resulted in strong cooperation with industry. Thanks to this a big group of students can work during studies. The research done on a group of computer science students revealed that working students had higher level of experience that non-working ones [13]. Higher education institutions take measures to bring their education closer to the needs of the labor market. One of the directions of these activities is the professionalism of education [14, 15]. It is important to support the education of students with particular emphasis on education, research and innovation. For postgraduate students, this should be a priority [16]. Developing knowledge and technical skills – this trend is visible not only among young people. There is also a significant group of adult people who are highly motivated to gain professional knowledge in technical education areas – especially computer science [17]. The professional development of students depends on many factors [18] as well as influences, e.g. socio-cultural [19]. To stand out from the competition on the labor market, you should take care of such a valuable experience already in college. Lack of professional experience often undermines the chances of even the best-educated candidate to get a job. Due to the wide availability of higher education, there are many people with higher education. It is difficult to compete with older colleagues with a wealth of experience. Talking about experience should emphasize not only work in companies, participation in projects, training, professional internship, etc. Should also present your competences and developed skills.

However, in order to develop in a concrete manner, it is worthwhile to take advantage of the technical offers of organizations such as IEEE or BEST in the international arena. As a member, you can count on career support and professionalism. BEST has so called BEST Career Support which is divided in two main categories. The first part is called BEST Career Centre. The second are in-person events like: job fairs or competitions [11]. BEST Career Centre is the recruitment online place with partners' BEST offers. An account on the website BEST and subscription to BEST Career Support is needed. Account for student is like a CV with information about student career and education. Students can find some information about partners' offers and next take part in internship, courses and also get a job. One of BEST Career Service functions is Career Newsletters. BEST also organize BEST Career Day offers a lot of ways for students to contact with companies. Furthermore this organization creates a platform for technical students all over Europe – BEST Educational Involvement. It provides raise educational awareness of students and their input of European Engineering Education (EEE) [11]. IEEE offers a wide range of experience and career opportunities. Based on highly developed networking, IEEE offers a special Career Programs. It includes: engineers week, competition, job fairs, soft-skill seminars, webinars, networking events. Also important is an IEEE Job Site, IEEE memberNet directory, IEEE Mentoring Connection [20, 21]. The IEEE Certificate Program is essential for obtaining professional technical knowledge, certified by an IEEE certificate. IEEE-USA operates CareerNavigator. If students are looking for a job, they can use the IEEE JobSite.

IEEE / BEST membership is valued by employers. By engaging in the organization and publicly displaying the results of our work, we can be seen. Frequently, conferences and events of international technical organizations show representatives of companies and technical institutions
looking for potential employees. And in this way - instead of looking for work alone, the work itself will “find” us.

3 METHODOLOGY

The author conducted a survey to determine the importance and impact of international technical organizations on career development and experience. The study was conducted among a group of 90 people (students and doctoral students) - 79 members and 11 non-members of international technical organizations. 7 people are not members but plan to join the organization. The average age was 27 years. The study was conducted among Polish and foreign respondents. Participation in the study was voluntary.

The research tool was a survey. The respondents filled it up directly with the author in print form and also via the Internet in electronic form. The author meeting with some respondents, conducted additional interviews that supported the analysis of the results presented in Chapter 4. The research questionnaire consisted of 10 questions. The questions required: to indicate a single answer or to indicate the three most important answers or to express their opinion and justification.

4 RESULTS

Taking into account that among respondents who are non-IEEE or BEST members, the author put the question: What encouraged / will encourage you to start participation in IEEE/BEST? The most common responses were: the activities and program of the organization and the opportunities for self-development and learning. The results are presented in Figure 1.

When asked: What could discourage you to start participation in IEEE/BEST? The respondents had different opinions. Most often they pointed to conflict within the organization. Several other factors have been identified such as organizational scandals, organizational hermetic, lack of independence, poor communication and information exchange, promotion of activities that are not in line with the mission of the organization. The distribution of responses is shown in Figure 2.
For 84% of respondents, IEEE or BEST activity is needed. Some of the people justified their choice with the following arguments: promotion of international activity and scientific co-operation, development of future engineers, career development, openness to students and doctoral students, access to news and knowledge exchange. 14 people have indicated that they have no opinion.

Another question was the greatest advantage of participating in international organizations. The respondents indicated the three largest. 54% indicated: contact with specialists, transfer of knowledge and access to news, possibility to participate in various programs, courses and practices. Answers: scholarships and awards, foreign trips, others - were the least indicated. Table 1 shows the three most common responses systems.

<table>
<thead>
<tr>
<th>Advantage 1</th>
<th>Advantage 2</th>
<th>Advantage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact with specialists</td>
<td>Transfer of knowledge and access to news</td>
<td>Participate in a variety of program, courses and practice</td>
</tr>
<tr>
<td>54% of respondents</td>
<td>17% of respondents</td>
<td>14% of respondents</td>
</tr>
</tbody>
</table>

An important question was: Do you consider IEEE or BEST as a source of experience and a great career start? 92% said “yes”. The respondents could justify their choice. With the "yes" answer most often appeared arguments: establishing contacts, participating in conferences and practices, developing personal skills, participating in interesting projects. When choosing the answer "no" no one justified choice. The results are presented in Figure 3.
Figure 3. IEEE/BEST as source of experience and career start

Figure 4 shows the results for the question: Did your participation in IEEE / BEST facilitate your technical career and gain experience? Again, the respondents could justify their choice. With answer "yes", the respondents indicated that the organization made it easier for them to find their place in the labor market, provided them with contacts, organizational and social skills, and helped them gain high competencies through, for example: practices, training and courses. Only 3 people indicating the answer "no" gave justification. Namely: not starting a technical career due to rebranding, gaining experience by attending special mentoring programs for future engineers (before a person became a member of IEEE / BEST), not yet started a career.

Figure 4. Technical career and gain experience by IEEE/BEST.

As members of technical organizations, attention is paid to the benefits of membership. Therefore, the respondents were asked to identify the three most important benefits they have received from technical organizations. The most commonly chosen three answers are: gaining experience - from technical to social, participation in conferences and training, cooperation and information exchange. Other answers were: personal development, learning about other countries and people. Non-IEEE / BEST members indicated the answer: not applicable.

Participation in college student organizations often ends with the completion of study. In the case of international organizations, we have the option of continuing membership by changing membership status. With this in mind, the question was asked: Do you plan to continue your participation in IEEE /
BEST in the future? The results are shown in Figure 5. Non-members indicated the answer: not applicable.

![Figure 5. Caption for the figure]

The last question was: What do you consider the most attractive form of exchanging experiences in these organizations? 55% indicated workshops and branch (including practices, courses, training), 41% - conferences. The remaining respondents chose: Internet communication through accounts and platforms. Results are shown in Figure 6.

![Figure 6. Most attractive form of exchanging experiences in IEEE/BEST.]

5 CONCLUSIONS

One of the main objectives of the mission of international technical organizations like IEEE, BEST is to develop students. Organizations listen to students’ opinions, accept student ideas and allow them to implement these ideas. Through them, access to professionals, professional training, and innovative solutions is facilitated. And that translates into a number of opportunities for career development and gaining experience, often in a very dynamic way.

Studies have shown that IEEE/BEST can have a significant impact on a student's professional development. The most decisive factors for becoming a member of IEEE / BEST are: the programs and activities of the organization and the opportunities for personal development and learning. Any conflict within the organization or its ineffectiveness will cause a reluctance to participate. Respondents pointed the greatest advantage such as: contact with a specialist, transfer of knowledge and access to news, participate in courses, practice. According to respondents, IEEE / BEST are
source of experience and career start. 95% pointed that IEEE / Benefits from these organizations were indicated. The most important for the respondents are: gaining experience, participate in conferences and training, cooperation and information exchange. It concerns the most attractive form of exchanging experiences - workshops, courses, and training. 87% of respondents plan to continue membership in IEEE / BEST.

Due to the international organization (IEEE, BEST), especially important for members are conferences, workshops. During this time, members can meet new people from around the world, work together and work internationally. Participation in international projects or events is very developing for the participants. In addition to the benefits of a technical side (e.g. developing an innovative solution, sharing information, participating in international research), members develop social skills. Even the most timid person can go through amazing metamorphosis. Person taking a lot of action, developing personality, gaining experience and sometimes unconsciously influencing future career.

IEEE / BEST are large-scale organizations. This brings a lot of opportunities and contacts. It is worth noting that this organization is a space for gaining technical knowledge, improving skills, gaining contacts with specialists, working with companies. They offer so much and give leaving options.

REFERENCES


[5] IEEE, Engineering a Brighter Future with IEEE, IEEE Membership: Join the innovators of tomorrow, IEEE, 10-MEMB-0026 8/10 (marketing materials)


