
“The Role of Extra-Curricular Activities in the Formation of Engineers”

BEST Symposium on Education, Rome Tor Vergata
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Abstract - Summary

A Symposium is an educational BEST (Board of European Students of Technology) event, where students take part in discussions and have the opportunity to express own ideas on educational matters. This is done by an opening introductory plenary session and then in smaller discussion groups, with students and professors from technical universities. The Symposium is mainly run by the Educational Committee (EduCo) of BEST, and the hosting Local BEST group, in this case Rome Tor Vergata.

The topics vary on different educational issues. The title of this Symposium was "The Role of Extra-Curricular Activities in the Formation of Engineers". The main goals of the event were to analyze the role of extra-curricular activities in the formation of engineers today, producing documented research of good practice in this field and proposing solutions and ideas on how to integrate this topic in the European higher-education system.

The participants were students from different European countries and teachers from TREE, Teaching and Research in Engineering in Europe, a Thematic Network of European Union Commission.

Introduction

In the beginning of each day, a short introduction about the topic was given by EduCo members. Afterwards, the participants were split in three discussion groups, each group with its own facilitator and minute takers. The facilitators are EduCo members.

The general discussion was directed into three main threads that took place during the three days of the event: examples of extra-curricular activities, recognition of extra-curricular activities and competence assessment.

Background of the participants

Participants were from several different European Countries, thus giving a good picture of the methods used. Each group had students from highly-developed countries that give a great importance to extra-curricular activities, from countries that are currently trying to get updated with having ECTS recognized and students from countries that are still mainly using the traditional ways of competence assessment.

Presentations from Professors:

Extra-Curricular Activities at the Pollack Mihály Faculty of Engineering

Author: Professor Dr. József Ásványi, University of Pécs, Hungary

Pollack Mihály Faculty of Engineering has roots from the middle Ages (1367). There are 8 BSc Degree Courses, 3 MSc Degree Courses and 1 DLA Program. Total number of enrolled students is over 3,400.

The qualification requirements of engineering education are the state-of-the-art knowledge on the related professional fields, a high level professional competences in particular fields, the ability to accomplish scientific and R&D activities, the expertise in team-work, including international teams, the ability to perform creative engineering tasks, the capability of effective application of IT, an expertise in logistics, economics, enterprise management and an experience in quality assurance. The Extra-Curricular Activities can be sorted in two groups. They can be related to social and sport activities in order to develop the individuality and to improve the ability for team work. They can also be related to professional works in order to strengthen the scientific and R&D competences, to increase particular professional competences and to improve additional experiences. The Extra-Curricular Activities can also strengthen the Scientific and R&D Competences or they can increase particular professional competences or they can provide some actions to improve additional experiences such as managing skills for engineers.

An alternating (Sandwich) training can be provided with the Implementation of one or two practical semesters into the curriculum. For this training system, the student's tasks are defined by the company and the faculty. The main task is the elaboration of the final project work. The costs of the alternating training are financed by the employer. In that system, there are mutual advantages for students and employers.

Recognition and Assessment of Extra-Curricular Activities: Competence Assessment

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Extra-curricular activities serve a wide range of different purposes and they all result – besides of their specific aims – in individual learning outcomes, thus contributing to personal development. As these learning outcomes complement and often enhance curricular and professional learning objectives, they should be documented and recognized as far as possible. Research on learning and competence achievement illustrates that a significant (if not the main) part of knowledge, skills and competences, attitudes and individual learning strategies is gained through informal and experiential learning. In the same time, Higher Education is slowly moving towards outcomes orientation (modularisation and ECTS, accreditation, European Qualifications Framework).

In order to address the subject of recognition, there are some questions that need to be answered: What should be (formally) recognized? By whom? For which purpose and results? Which kind of approaches and methods should be applied? Universities and other Higher Education Institutions are still reluctant to recognize learning outcomes not gained in their own institution and programs, still

some countries allow or even force recognition procedures. Also, universities have problems with competence assessment and recognition, so at best they stick to content and knowledge recognition.

Competence Assessment by Assessment Centres is based on solving certain assignments or problems in groups, while the process as well as the outcomes are assessed by external evaluators with a specific view on the contribution of each group member. Self assessment of group members is often included. The advantages are that assessment is performance based and that different competences can be observed (like problem solving approaches, team work and leadership abilities, conflict management, subject related competences, etc.).

Competence based assessment schemes implement a diversified assessment scheme employing methods appropriate to the intended learning outcomes, which are defined in terms of skills or performance indicators. The staffs are trained to apply complex assessment methods and students are involved by self assessment. Different assessment tools have been developed allowing self-assessment of skills and competence development as well as workforce management. Examples are Euro-Record and Rapid. These approaches are related to skills or competences engineers should possess and they check out how far these competences are developed. They contain indicators for different levels.

Discussions Day 1

Topic: Examples of Extra-Curricular Activities

Students' lives are mostly balanced between study and family. However, education is more than credits and grades. In all disciplines of the education, there is a need for more dimensions than what only lectures provide. Especially engineering education needs to have a higher standard than the one achieved by simple lectures. Since so many depend on their work, future engineers have to be ready to overcome any challenge with which they are faced.

At this point, the extra-curricular activities arrive to complement the academic education. These are optional and usually non-credited educational activities, that can be related or not to the field of studies and conducted during the students' free time. From a robotic community or a research project, to sports, arts or involvement in student organizations, close to anything can be the subject of an extra-curricular activity.

Outcomes of the Discussion Groups

The participants defined the concept of "extra-curricular activity", they shared information related to how this is implemented in different universities and afterwards discussed using examples and new ideas.

Discussion group 1

For the students, the extra-curricular activities are related to enjoying their free time, out of the academic schedule, and in the same time these activities are useful for their personal development. In all European Universities there are many examples of extra-curricular activities like: students' clubs, faculty clubs, music and movie clubs, volunteer associations.

Even if the number of clubs or unions is high, the students experience difficulties because the amount of information is increasing and the really useful information is getting lost. The universities need to focus their attention on promoting these activities in a better way and one solution proposed was that student unions in each faculty should also have this task, of promoting extra-curricular activities to students.

When it comes to the number of members in these organizations, clubs or unions, the recognition of the activities [assignment of ECTS] plays an important role. In the same time, the students' behaviour has to be taken into consideration: there are some that only attend lectures and other that are active members in various extra-curricular activities. These students recognize the potential of such activities, where they learn how to solve challenging and real problems, using skills and knowledge. The participants are also mentioned that some of these activities, like BEST, are thought to be very useful in promoting international cooperation, in spreading a new mentality that companies are looking for, so that students can actually get better internships or first jobs. Usually, companies prefer people with working experience, especially international, but on the other hand it is very difficult to have such experience before graduating.

Sharing opinions gave to the participants an overview on the situation, helping the understanding and comparison of different systems. After discussing about the ways to solve the problems encountered, the group chose some ideas which are most important and should be implemented: database where teachers share their competences, so that students can ask for help when they want to go and work (even abroad) in projects related to these competences; company visits and case studies; statistics; community work; association rally; information about the groups; continuous assessment through the colour system.

Discussion group 2

The participants agreed that extra-curricular activities are all activities out of academic curriculum that contribute to self development. From their experience, European Universities offer a wide range of

activities, among which there are: clubs, newspapers, theatres, associations, extra courses, radio stations.

Universities should play the role of a garden for extra-curricular activities:

- Provide students with information about all activities available
- Promote also the possibilities coming from outside the university
- Support the groups with facilities (offices, money), especially at their start
- Show flexibility for students involved, for example with exams
- Work together with the associations
- Encourage involvement, by letting students organize their own time

There are universities where companies are very much involved in the educational system, being close to students since the start. Still, paid internships are more similar to jobs than to extra-curricular activities, although they contribute to self development. Starting from this, the group defined three environments: study, extra-curricular and job.

More examples of extra-curricular activities:

- Political clubs
- Social clubs (such as associations for welcoming new students, volunteering, cooking, wine tasting, health)
- Arts clubs (photography, culture, writing, handcraft)
- Technical clubs (such as Linux Interested Communities)
- Sports (such as sailing)

Some universities have it compulsory for students to take extra-curricular activities and this is important because it increases the value of the activity. On the other hand, some people just register and never get involved. This is why students would like to have these activities recognized and strongly encouraged, but not compulsory.

Discussion group 3

The extra-curricular activities are the personal activities done during in the students' free time, depending on context and not included in formal education. However, engineering students are gaining skills through these activities and sometimes it is possible to generate profits, in terms of money, for the involved people. Such an activity is research and development.

An extra-curricular activity for student A could be a simple curricular activity for student B, so extra-curricular activities can be classified considering each of these skills. Participants agreed that forced and compulsory activities can't be included in the extra-curricular activities. However, it has to be taken into consideration that students who work are also self-developing through that and their jobs might be sometimes considered extra-curricular activities.

Nowadays, universities offer mostly sport clubs, political clubs, performing arts, etc. However, there is the reality of the changing situation from one country to another. Some universities from specific countries, mostly Nordic ones, are supporting financially these activities. This fact became a comparison attribute for universities from different parts of Europe.

Extra-curricular activities which are applied in European Technical Universities:

- Business Game
- Student's organizations and associations
- Conferences (international, national, students' discussion)
- Sport activities

- Artistic societies, literature, orators clubs
- Magazine
- Political associations
- Projects (research)
- Volunteer society and charity
- Hobby clubs
- Environment organizations
- Part-time jobs
- Courses (foreign languages etc.)
- Engineering Competitions

Extra-curricular activities for engineering students which can be applied in European Universities:

- Debate contests
- Drama or acting club
- Participating to meetings between students and teachers
- International students project works
- Festivals
- Model United Nations
- Specific skill training (Leadership, teamwork etc.)

Discussions Day 2

Topic: Grouping examples of Extra-Curricular Activities Outcomes of the Discussion Groups

The participants decided on the grouping criteria and established categories depending on the criteria. The examples and ideas discussed in the first day were divided into the defined categories. The groups also discussed the promotion of extra-curricular activities in universities and new ideas to attract students.

Discussion group 1

The participants agreed that the criteria for grouping extra-curricular activities have to be based on the outcomes that these activities have for students. Outcomes can be distinguished as primary and secondary. The primary outcomes refer to the purpose of the activities and to what students are learning while being involved in them. The division of groups could be done also by providers.

Grouping makes the activities simpler to promote, by avoiding some possible misunderstandings. Moreover, grouping will be the basis for the activities' recognition. That is why students proposed two main categories:

- Activities related to students' studies and their future career
- Activities with outcomes of social skills, physical conditions related skills, creativity, competitions, organizing skills and cultural knowledge

Discussion group 2

The group found many difficulties to establish categories depending on the criteria. To solve the situation, the participants shared their personal opinion about:

- Functions of the activities for the student
- Contribution to learning and achievement of competences
- Degree of outcomes' recognition
- Contribution to life long learning
- Career perspectives

Students decided to create a list of extra-curricular activities and skills they can relate to. They discovered two ways of categorizing, so work was continued in two groups.

The first idea is to measure the extra-curricular activity, to find out what qualities it enhanced for the student. This can be represented in the form of three axes that meet in the middle:

- 1st axis goes from being passive to leadership (where the students are fully involved in the activity)
- 2nd axis goes from individual interest (personal development) to team work, social activity (for example, if the students learn how to cook, it's rather individual)
- 3rd axis goes from everything that is related to science, students' field of study (the way students can improve their education and studies), to something students do as a passion (no links to your studies)

The second idea relies on grouping activities in to three categories, which can be represented as circles. There are individual parts of the circles, a common part for all three and other parts that are common for pairs of adjacent two circles:

- Science education (for example research projects) and corresponding skills
 - Academic knowledge
 - Science
 - Presentation
 - Manual psychology
- Social (for example charity, politics, conference, debate, sports) skills:
 - Communication
 - Negotiation
 - Presentation
- Cultural (for example music, art, theatre) skills:
 - Creativity
 - Practical psychology

Skills like Presentation and Practical psychology are found in the zones where two adjacent categories/circles overlap. There are also skills that belong to all categories/circles: Organization and Teamwork.

Discussion group 3

The group focuses on the criteria and the competences developed by different extra-curricular activities, so that after categorizing, participants can discuss recognition. A first classification can be

- Leisure (art, sports)
- Professional or pragmatic (abroad, summer job, part-time job, projects, company visits)
- Associations (voluntary, political, students, clubs, religion)
- Learning (languages, computer, management, projects)

The e-world is defined as a box that contains a lot of tools connected with the previous classification, being a way to reach all the activities. The classification turns on representation in order to have a clearer vision of the interconnections and this grouping operation generates some remarks. The study of learning outcomes is proposed, in order to analyze the effects of each activity. In this way, it is possible to have a spread view to the world of extra-curricular activities. It is also suggested that it could be a good way talking about the topic through the concept of the black box, which is connected with the provider and the outcomes. Furthermore it is useful to identify the motivations that generate the desire of participating in extra-curricular activities, so the group starts a little brainstorming about the MOTIVATION (input) and OUTCOMES (output).

The following providers are identified:

- | | |
|-----------------|---------------------------|
| • University | • Political parties |
| • Organizations | • Course providers |
| • Companies | • Religious Societies |
| • Students | • Interested groups/Clubs |

The motives can be different including challenges, practical reasons, desires, need, career, meeting people, fun, new ideas, learning, health, "too much spare time", relaxing, pleasure, friendship, interest, self improvement, inspiration, relaxing, and adventure. All these ideas are grouped into six main categories of input:

- | | |
|----------|--------------------|
| • Social | • Personal passion |
|----------|--------------------|

- Need/Pragmatic
- Health
- Curiosity
- Self-improvement

Topic: Competence assessment

The European higher-education system is addressing the crucial problem of assuring that our engineering students receive a quality education, one that will enable them to make important contributions as professionals and citizens. This is done by assessing the outcomes of their education and, at the same time, by continuous curricula improvement. Assessing competence for a task requires definition of the core critical competences involved the appropriate method of assessment and the required competence of the assessors.

Outcomes of the Discussion Groups

The participants defined the concept of "competence assessment", its importance and use. They shared information related to how this is implemented in different universities and afterwards discussed how to improve current situation. They also thought about new ideas for competence assessment tools.

Discussion group 1

The students focused to find a proper, common definition for the competence assessment. They agreed that this is a complex method for evaluating or measuring the benefits of an activity, with the purpose of increasing the public recognition of this activity.

Some methods for competence assessment of extra-curricular activities were proposed:

- Personal evaluation related to outcomes
- Survey among colleagues
- Colour system for different categories
- Councillors teachers
- Self assessment
- Reports

Nevertheless, teachers have to take pedagogical training for the competence assessment of certain activities and evaluation of students. Each university is supposed to have a trial period in order to find its own assessment. Group interviews can be used. For better competence assessment, closer connections between universities and companies are needed, as companies can evaluate extra-curricular activities in a different manner than universities.

To promote them, professor should present the importance from the students' point of view at the beginning of the course. The universities should use websites and posters. Special presentations and events should be created for students not involved in any student association. It is positive that in some universities, there is a big union that embraces all student associations and presents what these associations are doing.

Discussion group 2

The students described the competence assessment of extra-curricular activities using three main words: measure, recognition and proof. Afterwards, they answered three basic questions, in order to understand how important competence assessment is:

- Why?
 - Apply knowledge
 - Easy access to information
 - Help for harmonization
 - Self-improvement (motivation)
- When?
 - Applying for a job/course
 - End of studies/course
 - Whenever it is needed
 - Before university

- How?
 - Practical (quiz, case studies)
 - Grades, diplomas
- Tests
- Projects

Discussion group 3

The group discusses about the communication skills and their correlation with extra-curricular activities. Identifying the level of skill (discrete, good, etc.) for communication in a particular context is of high importance.

Some ideas arise from the discussion:

- Interview to understand what a person can do
- Putting the person in the working conditions and observing especially the devotion for work
- Written report, with personal words
- Unifying all the papers issued by universities, so that they have the same meaning
- Making sure teachers have good communication skills
- Improved evaluation system, as now exams don't always give the proper mark
- Connecting the study system with the economical context
- Competitions with prizes

Competence may lie in communicating, team work experience, understanding not only the field of study, but also related topics (having specialized and also general knowledge). There are social competences, system, problem solving competences etc.

Discussions Day 3

Topic: Recognition of the Extra-Curricular Activities

Many countries still seem to have problems with recognition of credits between different institutions and also within institutions themselves:

- Problems concerning the credit transfer from one state higher education institution to another: there isn't a satisfactory recognition of all credits accumulated by the student from his previous courses, thus leading to the repeating of some (e.g. in Denmark, Austria, Estonia)
- Problems with transferring study weeks in between institutions or faculties: one school doesn't acknowledge the studies completed in another school, so the student loses a number of study weeks when changing schools (e.g. Law schools in Finland)

Universities are trying to solve this situation with recognition of credits for basic study programs and also for extra-curricular activities.

Outcomes of the Discussion Groups

The participants debated the importance of the extra-curricular activities, compared to traditional education. They shared information related to how recognition is implemented in different universities and afterwards discussed using examples and new ideas.

Discussion group 1

The participants agree that extra-curricular activities improve the self-confidence of students. Related to the development of knowledge, the experiences of students are also improving. Thus, engineering students have some unexpected benefits, such as the development of the creativity.

The discussion is based on technical skills against social ones. The general opinion is that knowledge is useless without social skills and also that technical skills are easier to be gained than social and human ones. Still this depends from student to student. Comparing the traditional system and curriculum full of extra-curricular activities, students have doubts about the exams. They ask themselves if this is a totally wrong method of learning, thinking that extra-curricular activities also help in releasing the stress due to exams. They take into consideration the fact that, nowadays, to get a diploma is not enough. With extra-curricular activities, students are emotionally involved in learning. They gain a wider view of what is going on other fields and open their minds, so that they can choose a path for their future.

It's a verity that being so active in extra-curricular activities can have another view also: students lose their motivation for curricular classes. Thus, universities have to provide a good formation, which includes extra-curricular activities. However, relaxing activities like going out with friends are not included. To document extra-curricular activities, the university contacts can be used. In any cases, the documentation for these activities is a must in order to explain the results and the improvement.

Recognition of these activities is a discussion of two ways. They have to be recognized in order to push students to be more active in the society. If the students are gaining some skills related to their formation of engineering, they have to be recognized also. However, students are the living proofs of what they did, so considering this, extra-curricular activities don't need recognition. In addition, the system should not force or push students towards these activities, so instead the students can be motivated with the promotion of these activities by having extra credits. There is a way to document these activities by using Europass. However, this will be written by the student which won't let the universities evaluate them.

The universities can promote extra-curricular activities or motivate students for some areas and projects. To motivate students, they can give a diploma or for some activities, they can give credits, only if the university decides which skills are necessary for students and which activities related to these skills. Every activity can be recognized by universities however, as it's too difficult for universities to check what students are really doing, only the activities related to the courses and for the professional life of students

should be recognized. On the other hand, companies are not interested with the recognition of these activities as they have their own evaluation methods.

As a conclusion, extra-curricular activities can be recognized with ECTS credits or a diploma supplement at the end of studies. In any case, universities have to motivate students to have such activities and not force them.

Discussion group 2

The discussion is comparing the credit systems and their functionality, in many European Universities, as there are still problems in the area. This result is considered to be a bit surprising, as the area of recognition is still the most legislated and agreed one. Universities are trying to solve this situation with recognition of credits for basic study programs and also for extra-curricular activities. Countries that have credit accumulation system are based on national credits and/or based on ECTS. Countries without credit accumulation system are about to have a credit accumulation system or just without any particular activities.

ECTS *European Credit Transfer System* – is a student-centred system based on the student workload required to achieve the objectives of a program, objectives preferably specified in terms of the learning outcomes and competences to be acquired. Participants of discussion decided that ECTS should include profession related activities, and the new credit system (e.g. points) should be for non-professional activities like extra-curricular activities. Work on new credit system was great challenge for students because they had to find a solution to recognize extra-curricular activities on every University. Due to the creation of a common system the advantages are motivation, recognition, promotion, flexibility and consciousness of extra-curricular activities. However, the disadvantages can be misuse of the system and not part of a formal education.

Finally after long process of preparing materials, exchanging knowledge and experiences among students from many countries, the participants created a structure of the "new system" which should be flexibility, the human factor (Teacher counselling), a recognition through points, an evaluation of participation based on efforts, but not on outcome and the extent of participation (for example, attending a meeting as participant or organizer).

Main conclusion of discussion about recognition and new system is that extra-curricular activities have to be recognized by universities and effort required to make awareness in companies to consider the activities and skills students can gain from them.

Discussion group 3

The participants agreed that recognition of some extra-curricular activities is necessary, because practice and experience are needed beside formal education. The recognition would be used in order to provide documentation for future employers, to increase the student's motivation and in the same time to increase the student's options to customize the University experience. Thus, outcome based experiences should be recognized: courses and activities providing leadership, communication, teamwork, entrepreneurship/creativity skills.

Recognition has the risks of people doing extra curricular activities just for the certificate, or even inventing bogus experiences. Taking this into consideration, students should not be forced with mandatory activities, but encouraged to take part in them. By including such activities in each academic year, the temptation to give less attention to formal education is diminished and extra-curricular activities will exist in the form of bonuses. Students believe that practicing sports should be supported as an extra-curricular activity, for example by allowing one year more to finish studies. Still, formal recognition should be given only for high standard activities. Also, universities should provide tools to recognize the skills they include in the competences.

Extra-curricular activities recognition is possible by assessing credits and permitting replacement of elective courses, based on these credits. Another way is to mention them on the university diploma, combined with a certificate given by the university. The process of recognition should be application based and voluntary. The student would provide the proof of involvement, like references, and the description of

experience and skills achieved. After an evaluation done by relevant professors, the conclusion would have the form of “pass/not accepted” and only for courses also grade.

Addressing the risks of the method, in order to avoid cheating, extra-curricular activities should have a low percentage from the total amount of credits, in case of replacing elective courses, of around 5%. A strict policy regarding cheating is needed, to act as a preventive action. Also, the evaluation of other persons’ involvement should be done on an anonymous basis. The students believe that, in the end, it should be easier to take other elective courses than to risk cheating.

To conclude, the group agreed on having recognition with a limit and two models of implementing it:

- Elective courses taking up to 5-10% of the program, evaluated by teachers who have theoretical background related to the skills recognized
- Certificates to recognize the skills gained while doing certain extra-curricular activities, but without replacing university courses

Credits

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