

## Involving students in curriculum development

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### INTRODUCTION

Asking students opinion, mostly by a written feedback, is a common practice used to evaluate educational programmes. Such action was taken for instance by Nancy El-Farargy, analyzing preferences of Higher National Chemical Engineering students [1]. Some researchers use different methods to get more qualitative feedback. In their paper [2], Asli Lidice and Gokturk Saglam are presenting their method to evaluate teaching at English preparatory school. Starting with choosing proper sample, through survey, interviews and field notes, researchers received complete opinion on evaluated topic and points for improvement. Having solutions designed, they have met again with the participants, discussing key points and presenting an implementation plan. Such attitude was explained by a duty to prove students that their opinion is valuable and inform how it will be used. It is not a common practice though.

During an online research, authors of this paper did not find publications analyzing the problem of educational system evaluation process itself. Surveys are the main tool used to analyze student's opinion and other means are not very often considered. Follow-up and presenting implementation plan to students is not a common practice either. Through this paper, by combining the results of market research conducted among European students with description and evaluation of Events on Education, authors would like to present various problems of involving students in curricula development and present possible solutions practiced by Board of European Students of Technology (BEST).

BEST perceives students as one of the major actors in the development of education. In this way it has been striving to bring the development of European Engineering Education (EEE) closer to students. By organising events on educational matters BEST brings students' opinion into the spotlight to meet both their, academics' and industry's needs. The work of non-governmental organizations like BEST in the development of students' extra-curricular education and promotion of soft skills is becoming widely recognised as an important tool to improve students' curricula [3].

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## 1 RESULTS OF BEST RESEARCH

Since Educational Involvement (EI) is a key priority and one of the three main services of BEST, it is very important for BEST to evaluate its work and impact on students in this field. During the years 2012-13 BEST conducted an extensive research among students regarding all the fields related to its three main services: complementary education, career support and educational involvement.

In the online survey, done using surveymonkey, 2234 European engineering students from 95 different Universities in 33 countries answered questions regarding their Educational Involvement. Of the survey's respondents, 51.8% were male and 48.2% female students. Most of the students are undergraduate (60.1%) or post-graduate (26.0%), rest of respondents are second master (1.4%), second degree (1.7%), PhD (2.6%), graduated (3.3%) and high school (4.9%) students. The most important results are presented in the next paragraphs and became the basis for the work of BEST in the field of Educational Involvement of students.

Interesting results became apparent already with the answers to the first question. Almost 45% of the students said that they did not have a chance to evaluate their educational programme at all. It is important to work on increasing the number of students having the feeling of being included in the development and improvement of their educational program. Moreover, by promoting importance of evaluation to students and possibilities for them to take part in this process it is possible to increase these numbers. Another consideration which needs to be taken in the further analysis of answers is that some students didn't understand what evaluation of the educational programme stands for.

From those students who had evaluated their educational programme, 89.4% had the chance to evaluate university courses, 63.9% their semester curriculum, 43.9% the total content of their academic year. However, only 14.0% had the opportunity to evaluate national educational system and 8.3% evaluated European Educational System.

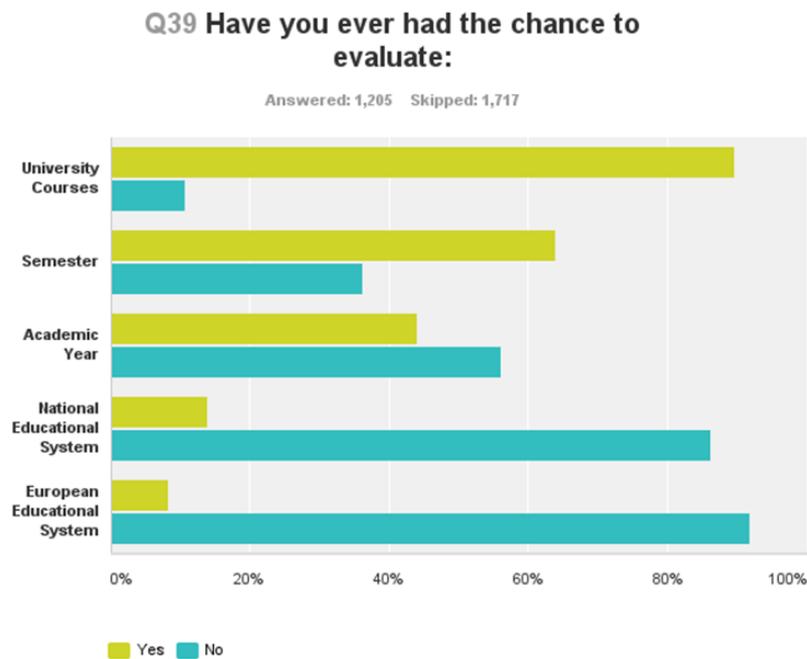


Fig. 1. Graphical representation of statistic of students answers

As can be seen on Figure 1, most of the students had the chance to evaluate their semester and academic year, however they had very few chances to evaluate educational system on national and European level. Low results on evaluating European educational system can express the low level of knowledge of students on the reasons for evaluation as well as their inability to distinguish the bodies providing the opportunity for evaluation. For instance, in many cases Universities provide surveys to collect data for national or European statistics, however students might see this as local evaluation. It is very important to show students that their input is already taken into account, as well as to get more accurate survey results in the future. Moreover, it is important to enhance

the evaluation on National and European level and to compare answers with universities' efficiency and results in teaching.

### Q40 How were you asked to give your opinion for the evaluation?

Answered: 1,205 Skipped: 1,717

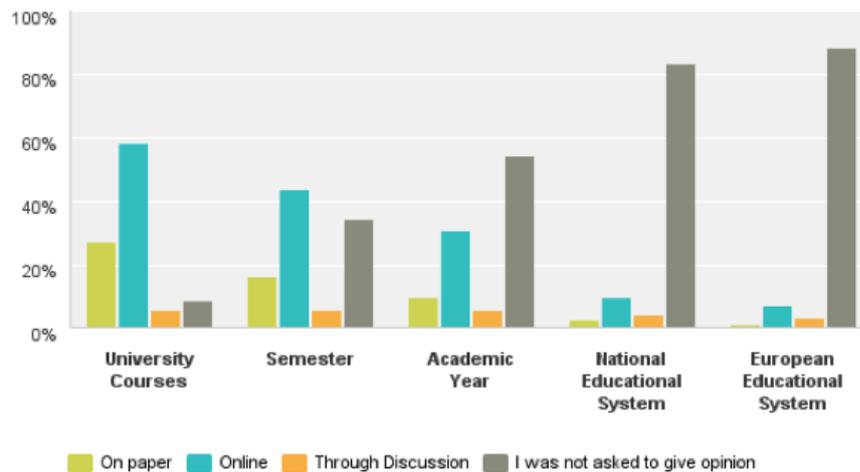


Fig. 2. Technical solutions to ask students for feedback on different levels

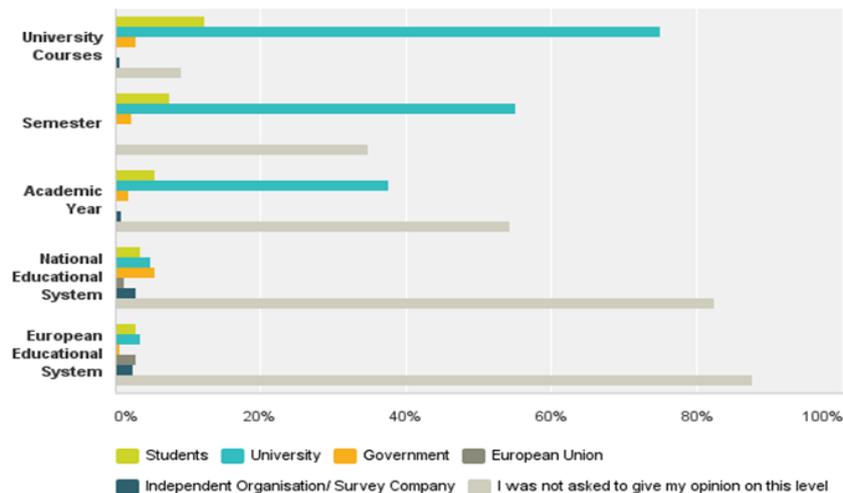
Given the prior separation of the academic studies (courses, semester etc), students were asked to define whether they evaluated on paper, online or through discussion sessions. It is noted that the most widely spread evaluation method is through online surveys (Figure 2). Moving to a bigger scale the rates are highly reduced, while more than 80% of the answers refers to lack of requesting students' opinion.

An important percentage of 27,5% is allocated on paper evaluation of university courses but on the next levels the rates are falling drastically, with the lack of requesting students' opinion being on the first place. Same patterns as above can be recognised when it comes to discussion sessions.

One of the conclusions is that quantitative feedback through anonymous surveys is still the most popular tool to evaluate the curricula. Such attitude is not engaging students in developing their programme and may not convince students that their opinion is valuable.

**Q41 Who initiated the process of evaluation? \*initiate = to cause (a process or action), to begin**

Answered: 1,205 Skipped: 1,717



**Fig. 3.** Different bodies collecting students' feedback on educational system

Following the same division of academic studies, students have been asked on who initiated the evaluation process. Most of answers for once again, have been on the lack for giving feedback and especially on National and European level (figure 3). An exception is the university courses, where 74,8% of students replied that their university initiated evaluation proceedings.

Given the results, there is a lack of awareness noted between students, regarding the evaluation processes on European and National level. The majority of the evaluations are running under the guidance of the university management concerning courses, semester and academic year. Also, students pay significant role in taking feedback from students on local level while on a higher level they have less interaction.

On the question "What do you think that University does with students' opinion?" 55.7% of students answered with "nothing or just read it internally". Just 10.6% of universities published results of their surveys' statistics. On the other side, 31.9% of students think that Universities make some smaller changes after they analyzed students' input and just 1.9% think that their university did bigger changes.

Answers suggest that dissemination of surveys' results is very low and students are not aware why they filled it, neither what is the follow-up of it. BEST will work with dedication to improve the situation in this field, however, same attitude is needed within other organisations and universities themselves in order to make students more interested in the process of evaluation and generally in educational system improvement. A solution presented by Asli Lidice et al [2] or the one proposed further in the paper may solve this issue.

Since one of main concerns of BEST is to increase the number and quality of students' input regarding engineering education, the last question was about the educational levels which the respondents would want to evaluate in the future. It appeared that much more are interested in evaluation than had chance to do so. Still, most of the students would like to evaluate university courses (88.3%) and semester (78.7%). However, 75.2% of the students wants to evaluate academic year (comparing to 43.9% who had chance to do it).

The number of students who would like to evaluate the national educational system is 77.9%, which is 5.5 times more than those who had chance to do it. The biggest difference is definitely between those who want to evaluate the European educational system (65.7%) and those who did it (8.3%, which is 8 times less). This shows us that there is lot of space for research on national and especially European level what is big opportunity and obligation for all international organisations which are working in this field. Knowing this, BEST decided to put more effort on engaging students in Educational Involvement through its events.

## 2 BEST EVENTS ON EDUCATION

BEST annually organises many different types of events, from courses on various topics, to engineering competitions and job fairs. The aim of those events is to bring students closer to the remaining two stakeholders, which are universities and companies. In this particular paper the focus will lie on Events on Education (EoEs) and Local Events on Education (LEoEs). Reason for this is that these events are designed so that its output to be used in improving Engineering Education (EE).

Events on Education are approximately one week long events gathering about 25 engineering students from around the Europe. Those events are organised by Local BEST Groups (LBG) in cooperation with the Educational Committee of BEST. The goal is to provide these students the opportunity to voice their opinion on current hot topics within EE as well as to inform them about latest trends and developments. There are two types of such events, Educational Symposia and BEST Academics and Companies Forum (BACo). A Symposium gathers students and academic representatives from universities and Higher Engineering Institutions (HEIs) while BACos in addition to these two stakeholders have also industry representatives participating in the event. During these events students participate in various kinds of discussions, workshops, small team projects and case studies which are lead by external experts from HEIs and members of the Educational Committee of BEST that are responsible for developing the content for the event. All these activities are tools to gather students' opinions on selected topics of interest and also provide them with a platform to share experiences and new ideas.

The idea of EoEs was generated in 1996. The same year BEST started cooperating with Higher Educational Institutions (HEIs) like SEFI and CESEAR. A certain gap in communication and cooperation between the three stakeholders was observable and therefore those events were established in order to bridge this gap and bring all the three stakeholders to the same table. Every year the concept is improved and further developed, and so throughout the years we have gained a lot of knowledge and were able to contribute to many projects on European level, proving our credibility. In addition, the concept of LEoEs was born just few years ago, in 2005, and it was derived from EoEs. It was noticed that many universities are struggling with some issues on local level and the problems are very specific to each one of them. Having a long experience with EoEs and willing to reach as many students as possible LEoEs took shape. These events last from several hours to 3 days and are organised by Local BEST Groups. They involve students from the university, business representatives and local professors who together discuss concerns of their own university. Activities taking place during those events are similar to those in EoEs as the principle stays the same just the scale of the event is smaller, as it comes against issues on that level.

## 3 STUDENT INVOLVEMENT METHODS AND PRACTICES FOR EOES AND LEOES

BEST Events on Education and Local Events on Education provide a powerful platform in order to bring together students, academia and in specific cases, also companies. It is a possibility to collect, process and spread the input gathered from the involved parts. This process goes from the content source event until the post-event dissemination, creating a cycle in which all the components have intersections and connections. The following paragraphs intend to present the methods used in the aforementioned process.

### 3.1 Facilitation process

First of all the schedule of the event is built according to an inform-engage-disseminate structure. This structure is repeated in the various building blocks of the event itself.

Both EoEs and LEoEs involve the figure of one or several facilitators, who contribute to the structure and process of interactions, so that the involved parties are able to function effectively and make high-quality decisions. These facilitators are usually members of the BEST and use different facilitation methods (also called formats) in order to ensure that the sequential discussions between the academics, experts and students follow a logical structure. These methods are chosen from a database of methods selected from various scientific papers, as well as facilitators' experience. Members of Educational Committee constantly seek for new ways of interactive conversation capable of appealing young and professional audiences, enabling participants to the discussion to provide constructive input.

The choice depends on the topic under question, the outcomes that are expected, the formats diversity and other factors specific to the event. The most intensively used formats during the events of past years are, in order of frequency: Open Space Technology, debates, group discussions using SWOT methodology. Less frequently used but powerful approaches are the World Cafe' and Exhibition Walk.

They will be presented in following sections with the outcomes they brought, depending on the event they were used for.

### 3.2 OST – Open Space Technology

Attendees are asked to generate the meeting agenda as well as participate by leading small group break-out sessions during the session time. There is usually a facilitator, but no official meeting leader who demands compliance.

While the mechanics of Open Space meeting provide a simple means to self-organize, it is the underlying principles that make it effective both for meetings and as a guidepost for individual and collective effectiveness. The organizing theme of an Open Space meeting is that people who care about the subject will come together. The initial meeting notice takes the form of an invitation, thus the people who have attended have chosen to be there and are willing to contribute. This method was used for the BEST Symposium on Education held in 2011 in Riga Technical University.

During the OST following four topics were discussed:

- International vs. national internship
- Do your studies prepare you for the business world?
- How to motivate employees who work online?
- How do you see the future of online work?

At the end of the session, each subgroup presented the outcomes to the entire audience, as a first step of dissemination of outcomes.

On the subject of national or international internships, students compared them, coming up with a list of pros and cons of both. The consensus was that when choosing, a student has to evaluate the following aspects. In the second panel, participants evaluated whether their curriculum prepares them for the labour market or not. They evaluated the differences between the expectations of future employers and academia, since universities value long-term thinking, knowledge and theory more than short-term results, financial success and practical applications, as companies do.

The third discussion discussed the common problem of motivation of online employees. The main solutions proposed were organizing tasks into milestones and rewarding employees when completing tasks. During the discussion, a new topic came out and thus a new group was formed: it emphasized the importance of a direct correlation of results and reward, as opposed to a time-based system. Finally, regular feedback, constant contact and recognition were mentioned as very important factors.

The short fourth discussion on the future of online work came to the conclusion that different fields have different potential of this tendency, and that a combination of both practices would lead to the best results.

The OST technique revealed valid in this occasion because: it allowed to discuss different topics at the same time; new topics can be discussed on the spot simply by creating another group; everyone gets involved because of having small subgroups.

### 3.3 World cafe

This method, as the name might suggest, aims at recreating the informal conversation atmosphere of a cafe', to engage participants in a sharing environment in which they can carry insights and ideas from one conversation to another, creating a meaningful and cooperative dialogue.

The idea is to divide the participants in small "table groups", sparking different conversations in each of these. People then are invited to move between tables, thus connecting and building up the conversation in an iterative process. In each table group there is a fixed "table host" person, who takes note of the evolution of the conversation and welcomes the new arrivals.

This method was used in the event "Education for Sustainable Development" held in Vienna in September 2012.

A short introduction of roughly half an hour duration was used as impulse by the respective professors. The table hosts then lead the following one hour long discussion and participants were putting down results on flip charts. The groups rotated so that each of the symposium topics was discussed in three sessions by two different groups, always iteratively building on the findings of the previous groups.

The learning cafe had 8 topics. Participants were split in 4 groups, and had 90 minutes to discuss two of the 8 topics, so both diversity of opinion and investment on the topic could be assured. The focus areas were: sustainable urbanisation, sustainable lifestyle, cultural diversity, poverty reduction, biodiversity, disaster risk reduction, climate change and energy, organisation best practices. Since the event had a very wide focus area, World Cafe was selected because it has been found that it conducts in-depth exploration of multiple subjects.

World Cafè looks very similar to OST, but it is preferable when there are many topics to choose from. With OST such a long list of possible discussions to join could look overwhelming to pick only one from and would not motivate people to change the topic once chosen.

### **3.4 Debate**

The word “debate” is intended here as an interactive role game in which people team up to affirm their points of view in the most convincing way. Each debate speech resembles an “elevator speech”, a concept used in sales and business to indicate a short but compelling presentation of all the key values of an idea.

This method was used, for example, in September 2013 during the EoE in University of Aveiro, Portugal. To develop the criteria that should be met for the accreditation of soft skills, participants were divided in 6 teams and each one was discussing and coming up with the probable criteria. Later, after finalising and prioritising the list, teams were paired up and had a round of debate where teams defended their most important criteria and argued on their preferences.

Debate is not only a good way to get an opinion but also a way to make students think of other side of every problem (e.g. when they are asked to get in the role of professors).

Debate and discussion groups are easy methods for discussion in LEOEs as they involve people of the same nationality and thus oral is an easy way to engage in constructive and fast communication.

### **3.5 SWOT**

SWOT is an acronym for “Strengths Weaknesses Opportunities Threats”. This four words represent four quadrants in which to put, through brainstorming and cooperative discussion, different features of evaluated object. This framework enables people to become conscious of what is and what should be consolidated of the analysed project, by transforming threats and weaknesses into strengths through opportunities.

This method was also used in EoE in Aveiro in 2013, to imagine how it could be possible to create an accreditation system of soft skills in the curriculum of an engineer.

After filling in all four quadrants of SWOT matrix, students were brainstorming on how to take advantage of the opportunities, using strengths. They suggested development of certain platform, that reveals the needs of the industry towards universities regarding the topic of soft skills or industry and student conferences, that ensure interaction between these two stakeholders.

Further on, discussing how to overcome threats using specific strengths, a conclusion was reached that firstly we need to organize frequent external supervision and organisation of annual seminars/meetings/discussions that would provide feedback from all the stakeholders. Regarding the teaching staff, professors could be coached to implement soft skill development inclusive working methods and/or company representatives could get involved in the educational processes by giving sessions of workshops on soft skills. In the process of discussing the strategies to overcome weaknesses by taking advantage of the opportunities, again students referred to the communication challenges and lack of feedback instruments. Participants find the development of a platform that involves stakeholders which deal with supervision of the system really important.

The SWOT technique is usually effective, in the cases where it is important for all members of the discussion to be familiar with the current state of a system or product. This knowledge can be then used to improve on said system.

The list of methods, events and outcomes presented so far is, as previously mentioned, just a selection of the practices that were evaluated to be more effective. Moreover, due to the diversity of EoEs and LEOEs, it is difficult to make one-to-one comparisons.

### **3.6 Minute taking and dissemination methods**

In order to ensure that all of the information during the event is recorded and viable for further use, the methodology plays an important role. The pre-material for the participants before the event has its central task in getting everyone acquainted to the topic prior to the event. The information step

repeated then throughout the event with dedicated presentations, videos, talks to introduce the topics that will sequentially be analysed. This ensures that the discussion flow according to the facilitation method is uninterrupted. In addition, it will help to centralize the minute-taking. Minutes of the different sessions during the event are recorded and are used as one of main sources to later form a unified document. Moreover, in special cases it is needed to record the audio of the discussions, to ensure the quality of documenting the outcomes of e.g. debates, where interpretation of words might change the core of idea. The document of the utmost importance is the event report, that summarises preparation, execution and follow-up, for which all the above mentioned ways of recording the outcomes are used. Reports are used to disseminate the event result, by sharing them among interested stakeholders and as guidelines for scientific articles.

## 4 CONCLUSIONS

The results of the survey showed that there is a lot of space for students involvement into educational engineering improvement, especially on European level. Publishing results and promoting follow-up actions of surveys must be done in order to make students see how much their voice is important and what it can influence. Otherwise, one of the 4 important stakeholders of European Engineering Education (University, Students, Government and Companies), probably the most important one, won't be motivated to work on its own future and the future of engineering education.

Since number of students who are willing to evaluate engineering education on national and European levels is much higher than number of students who had chance to do it, it is important to involve students more in the development of university programs. Universities and organisations should explore how to do evaluation with students most efficiently. Moreover, having in mind answers students gave regarding follow-up of evaluation, it would be interesting to know how increasing of follow up will influence students' will to do the evaluation.

Based on its research, BEST is trying to increase the number of students who participate in evaluation, especially on European level by organising EoEs. In the following years BEST will try to connect students and universities even more in this process of development of university programs through BEST Educational Platform, a series of events, where students will be able to evaluate and work out solutions to problems regarding quality of engineering teaching and education.

There are different methods to ask students' opinion and which one is chosen, depends on what we want to achieve. Some may be used for idea generation, some for problem solving, some for teaching to reach common background. Through EoEs and LEOEs, BEST tries to combine these methods to get best outcomes which can be useful for all sides. Moreover, through the EoEs BEST ensures two ways communication between students and other stakeholders: on one side students' voice is heard among other stakeholders and on the other side to improve awareness of students regarding Universities' actions.

By spreading good practices through conferences, meetings, reports and papers BEST wants to help other organisations and especially universities to include students more in the process in the most efficient way. Therefore the methods presented in this paper are proposed to be used in involving students in curriculum development as members of BEST believe that bigger cooperation among all stakeholders will result with faster development of curricula.

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