

A survey of course assessment at “Politehnica” University of Bucharest

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Abstract - Although seldom used in Romanian Universities, an attempt to investigate students' assessment regarding teaching activity at “Politehnica” University of Bucharest was conducted starting with the academic year 2003/2004. In order to enable a comprehensive analysis, the proposed course assessment includes: a student self-assessment, a course/curriculum assessment and an instructor assessment. The paper focuses on the assessment process and its results and on the way in which this process helps assuring the quality of the academic educational system. Pursued firstly as on a voluntary basis and mostly as an individual-driven activity, the assessment of engineering teaching activity should be now part of the mandatory assessment process, according to the Romanian Agency for Quality in Higher Education rules. Following the Bologna process, major changes in curricula at “Politehnica” started to be effective in 2005. As a consequence, some courses are offered in parallel to students in the last semesters of study and to students in the first semesters. We focused on this particular situation when analyzing the results of conducting such an evaluation for the same course, presented by the same instructor, in the same year (2006) to students enrolled in different semesters, with the aim of highlighting the importance of different variables of the teaching process.

Index Terms - Course assessment, Curricula changes.

INTRODUCTION

On 27th of March 2006 the Romanian Parliament approved [1] the Quality in Education Law promoted by the Romanian Ministry of Education. It is envisaged that each higher education unit should develop and apply starting with the year 2006-2007 its own Quality Insurance System, with its own organization, performance indicators, approval and evaluation mechanisms, for ensuring the learning process' transparency.

In order to properly apply this system, a commission has to be established within each educational institute. Besides the establishment of a commission, the Quality Insurance System must include a set of rules and principles, which refer to the following aspects: policies and strategies for the quality insurance; methodology of approval, monitoring and periodical evaluation of the educational program and the

given qualifications; quality insurance of the teaching personal; evaluation of the studying materials and of the support that is given to the students; a database organization, which allows an internal auto evaluation; a periodical information publication regarding the quality of the offered study programs.

As the officials pointed out [1] already in spring 2006: “The adoption of the Quality Law represents a decisive steep towards the reformation of the Romanian educational system. This means the introduction of clear criteria for performance, educational institution's evaluation and the establishment of the quality as the lead principle of the Romanian educational system. The Quality Law is, probably, the most important normative document after the Educational System's Law. This represents the base condition regarding the access of Romania in the European Educational System Space.” A direct consequence of this law was the foundation of ARACIS (the Romanian Agency for the Academic Quality Assurance). As its name suggests, ARACIS plays a key role [2] on quality insurance level, but also at accreditation level, offering in this way a complex external evaluation.

In order to be able to fully apply and comply with this law and, most of all, to have the necessary methods to meet the every day higher educational standards, at the Politehnica University of Bucharest started in the academic year 2003/2004 an attempt to conduct a students' assessment process regarding teaching activity. As the labor market is in a continuous evolving and changing process, the teaching staff needs different tools to help students prepare for the real life challenges. One of these methods is precisely the assessment. This paper focuses on one hand on the assessment process and its results and on the other hand on the way in which this process helps assuring the quality of the academic educational system. Pursued firstly as on a voluntary basis and mostly as an individual-driven activity, the assessment of engineering teaching activity is now part of the mandatory assessment process, according to the ARACIS rules [2].

ASSESSMENT VS. EVALUATION

In the following, we will use “assessment” as derived from [3]: “The goal of the evaluation process is to judge the quality of a performance or work product against a standard. The fundamental nature of assessment is that a mentor values

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helping a pupil and is willing to expend the effort to provide quality feedback that will enhance the student future performance. Assessment is the process of measuring performance, work product or a learning skill and giving feedback, which documents growth and provides directives to improve future performance. Evaluation is a judgment or determination of the quality of a performance, product or use of a process against a standard.” This definition indicates that evaluation or assessment should be done with a purpose in mind. Assessment generally has at least one of three purposes: to improve, to inform and/or to prove. Assessment can achieve all three of these purposes in the pursuit of excellence in engineering education.

Assessment is widely recognized as an ongoing process aimed at understanding and improving students learning. Assessment is concerned with converting expectations to results [4], while evaluation is recognized as a more scientific process aimed at determining what can be known about performance capabilities and how these can be measured. Evaluation is concerned with issues of validity, accuracy, reliability, analysis and reporting [5]. While both processes involve specifying criteria and collecting data/information about a performance of a work product, what is done with this data in each process is substantially different and invokes a very different mindset. Assessment can be done anytime, by anyone, for anyone. The role of the mentor is to facilitate the student success through quality feedback. The fundamental nature of the assessment involves an assessor expending the effort to provide quality feedback that will enhance an assessee’s future performance based upon the needs expressed by the assessed.

An assessment system should demonstrate that educational objectives are being measured and should be designed only for the purpose of further applying the findings to re-design and improve the teaching effectiveness. The program outcomes must be assessed by determining whether students are meeting course learning objectives. Clearly this statement is having as a background the representation of those objectives, which sometimes, especially in the gap period along with transition between two educational systems, is missing. Assessment results should reveal key features on the trajectory describing how well a program is accomplishing the previously established program outcomes. Assessment, however, requires not only attention to outcomes but also to the experiences that lead to those outcomes. Course survey or questionnaires cannot only be used to help measure the achievement of course learning objectives as discussed above, but also to determine ways to improve the course and the program. Assessment of a course within an engineering program would be incomplete [8] without determining the reasons why students are or are not meeting course objectives. Assessment data collected will be useful in improving course only if they are detailed enough to indicate why students are failing to meet minimum requirements on course objectives. Biased results might overlook the actual living conditions of the students (student houses in extremely noisy environments; the lack of internet connection) or the previous knowledge (as the admission in the first year of study is based on the evaluation of various, however non-correlated, results in high school).

Therefore, development of effective course surveys is very important in the assessment of a program. Written surveys provide many advantages such as the ability to cover a large amount of material while collecting unique student feedback that can easily be reported, but the results are highly dependent on the wording of the questions. However, it is difficult to write the questions in such a wording as to prevent biased results and to get the true opinions of the students. [6]

STUDENTS’ ASSESSMENT AT “POLITEHNICA” UNIVERSITY BUCHAREST. A CASE STUDY.

Until recently, Romanian academic groups in technical field were unanimously convinced that the increase of performance can be only reached through raising standards and pushing students and teachers for not meeting them.

However, more and more people are aware of the fact that significant gains in performance capability can only be grown in a student-centered environment that provides real-time, customized feedback. Although very seldom at the beginning of ‘90s, the Romanian engineering education environment silently started to promote choice between setting standards and pushing towards meeting them on one side and collecting data and giving supportive and constructive feedback on the other side.

Trying to assess its students as better as possible, “Politehnica” University of Bucharest is promoting a students’ assessment process, with the purpose of increasing the overall performance of engineering education.

The history of the attempt to conduct a student’s assessment center dates from a few years ago. The first attempt was generously intended to be submitted to each faculty member course responsible a questioner much elaborated. This questioner had three section of evaluation and one for comments.

- Course evaluation
- Resource evaluation
- Quality evaluation

The purpose of the course evaluation section was to collect data about the quality and the style of the teaching activities. The second attempt of such an assessment process is still in a draft format, but once convinced of the outcomes, UPB staff and the students will ensure a more solid base. The purpose of the assessment process is to point out the errors or possible errors in order for the student to be able to correct/avoid them. Sometimes it is very hard for the students involved in the academic process to realize the mistakes or to anticipate them, while it would be not that difficult for the more experienced ones, like professors. They can provide based on the information collected in an assessment center, professional customized feedback, very useful for the students. We want to point out that the survey on which results we base the comments in this paper is the result of a common effort – students and instructors.

In order to enable a comprehensive analysis, the course assessment – first draft- includes: a student self-assessment, a course/curriculum assessment and a professor assessment. It does not include a resource evaluation, because changing/improving the resources it is not usually a task that

either students or instructors can do, at least within the present Romanian university model. Moreover, this evaluation is not including a course quality evaluation, because the questioners were given and filled in the last lecture before the final examination.

The aim of this assessment is to gather as many information as possible regarding the course evaluation. During the 3 years of practicing this structure of the assessment and mostly of the information/data collecting process (an integrant part of the assessment) changed, the number of questions about the student-faculty and student-teaching assistant was reduced and replaced with questions that evaluate whether the technical objectives of the course had been met. The most recent one contains - as stated above- three-parts.

1. Rules for the implementation of the assessment

The questionnaires were submitted to:

- students enrolled in the second semester at the German Department, (FILS); course "Informationstechnik und Elektrotechnik II"
- students enrolled in the third semester at the German Department, (FILS); course "Elektrische Meßtechnik"
- students enrolled in the eighth semester at the Faculty of Electrical Engineering (EE), Course "Digital Signal Processing";
- students enrolled in the Master program at the Faculty of Electrical Engineering (Master), course "Signal Processing".

The questioner has a scale from 1 to 5, where 1 is designating "none" and 5: "very much". The students are not offered to answer with N/A, as the goal is to collect as many information as possible.

In the first part of the survey, students would retrospectively evaluate their competency in the core technical objectives of the course (eight to ten questions, corresponding to the main chapters of the course), as they perceived before taking the course and after having taken it. These ratings would be collected at the end of the term. This approach measures the student's view on how well they learned the core technical objectives. The difference between "before" and "after" response is one measure of how much the students feel they have learned and also of how much they presume that they know. It is important to make this remark, because very often students tend to supra-evaluate or sub-evaluate themselves [7]. Table 1 presents the results of this particular questionnaire.

2. Raw data from the submitted questionnaires

Following the Bologna process, major changes in curricula at "Politehnica" started to be effective in 2006. As a consequence, some courses were offered in parallel to students in the last semesters of study and to students in the first semesters. Therefore is became possible to analyze the results of conducting such a course evaluation for the same course, presented by the same instructor, in the same year (2006) to students enrolled in different semesters. As an example, Table 2 summarizes the Students' assessment of the instructor of the course Sensoren presented in German language at our University, the FILS Department [8].

TABLE I
STUDENTS' SELF-ASSESSMENT FOR THE COURSE SIGNAL PROCESSING
(FIRST SEMESTER 2006-2007)

Main course subjects	Oct. 2006	Jan. 2007	Achievement
A1. Signals. Signal's representation.	1,71	3,08	81%
A2. Fourier transformations.	2,23	2,83	27%
A3. Convolution of signals.	1,72	2,86	69%
A4. Moving Average -type filters.	1,23	2,53	105%
A5. FIR filters design.	1,31	2,6	100%
A6. IIR filter design.	1,32	2,63	103%
A7. Cebisev, Butterworth and elliptic filters	1,31	2,46	90%
A8. Processing of random signals	1,36	2,53	85%

TABLE II
STUDENTS' ASSESSMENT OF THE INSTRUCTOR OF THE COURSE SENSOREN
(THE 3RD SEMESTER AND OF THE 5TH SEMESTER 2006-2007)

Course and instructor's assessment	3 rd sem.	5 th sem.
1. Was the teamwork allowed/encouraged for preparing the homework and/or projects?	4,6	3,4
2. The course offered a multidisciplinary perspective?	4	3,6
3. Were used the electronic or informational technologies (web, e-mail, video projector, etc)?	4,7	4,6
4. Were the objectives of the course and its requirements clear communicated from the very beginning?	4	3,6
5. How would you appreciate the general level of the course? (5=excellent, 3=medium, 1=very bad)	3,7	3,6
6. How would you evaluate the available writing material (books recommended, scripts, etc).(5=excellent, 3=medium, 1= bad)	3,9	3,2
7. Had the professor an enthusiastic attitude concerning the educational process?	4,4	4,4
8. Do you appreciate the grading during the semester as fair?	4,2	4
9. Which was the expected difficulty level of the subject (lecture and laboratory)?	4,1	3,8
10. Was too much information offered during the lectures? (either as a quantitative approach or as a speed of offering this information during the in-class activity)?	3,9	3,8
11. Was the teacher well prepared?	4,8	4,4
12. How do you evaluate the professor's communication skills?	4,6	4,2
13. Showed the instructor availability towards the students?	4,4	4,6
14. Did the professor offer a real-time feedback on students' performance during the semester?	4,1	3,4
15. How would you evaluate in general the professor? (5=excellent, 3=medium, 1=very bad)	4,2	4
16. Which is the grade you expect to take at the final examination? [1... 10]	6,8	7,6
17. How do you appreciate the organizational skills of the instructor?	4	3,6
18. Was the professor concerned with the progress of the students?	3,7	3
19. Showed the professor availability for the students' questions during the course?	4,8	4,8
20. How would you evaluate the whole curricula of the course?	3,8	3,8

The second and the third part of the survey represent a student assessment of the course and of the instructor, which usually at UPB is a full professor in charge with the entire course. It is using a 1 to 5 scale. The final list of 18 selected questions was developed during the past 3 years.

The conclusions at the end of the evaluation process regarding courses that were exhibiting this particular situation are revealing (see Figure 1) some interesting facts: the students from both of the enrolling study years evaluated the difficulty of the course at the same level: 3.8; even though they have different levels of knowledge (and different prerequisites, according to different curricula they were enrolled from the beginning of their studies at “Politehnica”). But, when auto-evaluating the expected grades, the students from the 3rd year are with almost 1 point above. In the same time, the instructor activity was evaluated with higher marks by the students in the second semester, showing an optimistic view but less experience with the teaching system. It is worth to mention, that the students of this assessment spend in average 20hours/week on-line.

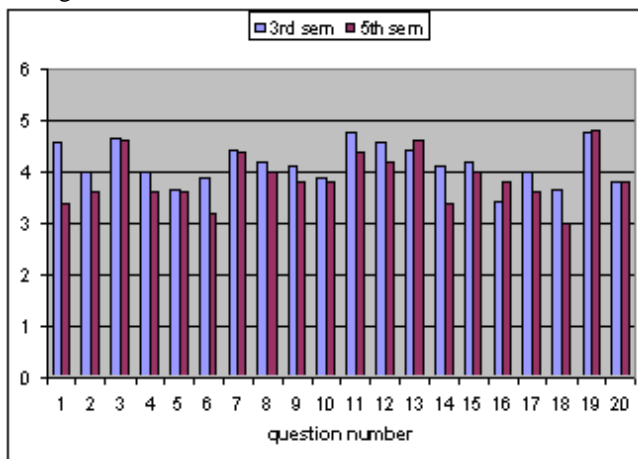


FIGURE 1

COMPARISON BETWEEN THE ASSESSMENTS OF THE SAME INSTRUCTOR AND COURSE, FOR TWO DIFFERENT CLASSES IN 2006 (GRADES ARE NORMALIZED TO A 0... 5 SCALE)

In Figure 2, a comparison between the results of an assessment process of the course “Digital Signal Processing” conducted in 2005/2006 and those from 2006/2007 is presented.

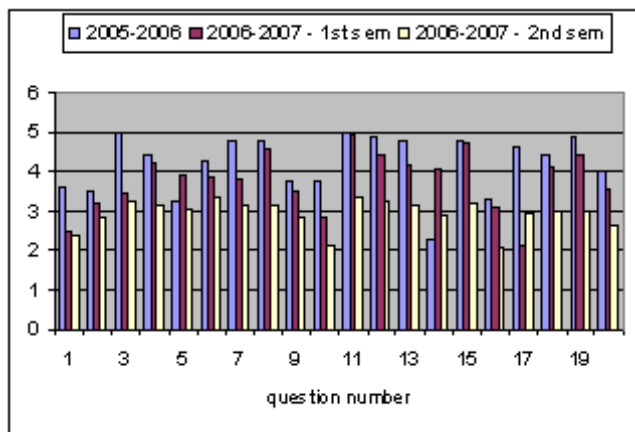


FIGURE 2

COMPARISON BETWEEN THE ASSESSMENTS OF THE SAME INSTRUCTOR AND COURSE, FOR TWO DIFFERENT SEMESTERS (GRADES ARE NORMALIZED TO A 0... 5 SCALE)

From the results in figure 2 we can draw the conclusion that the generation 2005/2006 felt better supported and assessed than the generation 2006/2007, although the course was presented by the same instructor, using the same IT technologies. The above statement is backed up also by the

results of the comparison between results of the assessment process from 2004-2007. In Figure 3 the outcomes corresponding to the course “Messtechnik” are presented.

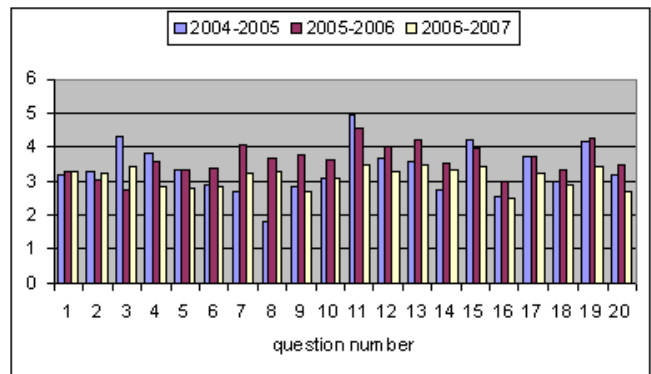


FIGURE 3

THE ASSESSMENTS OF THE SAME INSTRUCTOR AND COURSE, FOR TWO DIFFERENT SEMESTERS (GRADES ARE NORMALIZED TO A 0... 5 SCALE)

CONCLUSIONS

The student assessment process is improving each semester and therefore its structure is in a continuous evolution. The answers given to questions related to the subject density, presentation and difficulty highlight sometimes an improper scheduling of curricula. Following the first results, team work was emphasized in one of the courses and favorable acknowledged in 2007 by the students; one hopes to promote at the UPB level the acceptance of team spirit as an important learning product for engineers.

ACKNOWLEDGMENT

This work was supported in part by the CNCSIS grant 184/07.06.2006.

REFERENCES

- [1] *Legea Calitatii in Educatie*, in Romanian, available at <http://www.edu.ro/index.php/pressrel/4788>
- [2] *The Constitution of the Romanian Agency for the Academic Quality Assurance*, in Romanian, available at www.aracis.ro
- [3] Parker, P., E., Fleming, P., D., Beyerlein, S., Apple, D., Krumsieg, K., “Differentiating assessment from evaluation as continuous improving tools”, *Proceedings of the 31st ASEE/IEEE Frontiers in Education Conf.*, 2001.
- [4] Angelo, T., “Reassessing (and Defining) Assessment”, *the AAHE Bulletin*, Vol. 48, No.2, pp 7-9, 1995
- [5] *Standards for Educational and Psychological Testing*, American Psychological Association, 1999, available at www.apa.org/science/standards.html
- [6] Sanders, L., Tougaw, D., “Integration of New Course Evaluation Toll into a Comprehensive Departmental Assessment Plan”, *Proc. of the 35th ASEE/IEEE Frontiers in Education Conf.*, Indianapolis, 2005.
- [7] Scoles, K., Bilgutay, N., Good, J., “A New Course Evaluation Process”, *Proceedings of the 29th ASEE/IEEE Frontiers in Education Conference*, Puerto Rico, 1999
- [8] Postelnicu, I., Nemeş, C., Albu, M., Nemeş, T., “Improving Romanian Academic Environment. A Project.”, *Proceedings of the 3rd Balkan Region Conference on Engineering Education*, Sibiu, Romania, 12 - 15 September, 2005