

PARTNERSHIP FOR CREATIVE ENGINEERING EDUCATION (BACHELOR)

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Abstract — *The process industries need engineers (bachelors) who can run the factories optimally, and that mean discipline. But the engineers have, also, to be creative, to improve both processes and products. I think that the only way to achieve this, is a close cooperation between technical colleges and the industry. In small steps develop a creative engineering education by partnership between technical colleges and companies in order to meet the needs of the process industries for bachelors in engineering.*

Index terms — *Situation today, needs of process industries, influence in political frames for the technical colleges, contribute to partnership agreements, take part in projects, cooperate about courses.*

SITUATION TODAY

The applicants for the engineering education have dropped dramatically, both quantitatively and qualitatively, during the last years. Many students are dropping out during their studies, especially because of mathematics. There are many reasons for this situation. Many young people find science, mathematics and technology boring, and not creative at all. Many students do not find the connection between mathematics and the engineering role. The students are often, in lack of practice, and have very little industrial knowledge.

NEEDS OF PROCESS INDUSTRIES

Engineer (bachelor) is a practical engineer who is responsible of optimal running of the factory. And this needs creativity. He/she has a good foundation for lifelong learning, this means he/she must have knowledge in mathematics and physics.

INFLUENCE IN POLITICAL FRAMES FOR THE TECHNICAL COLLEGES

Do the political frames make it possible for the technical colleges to meet the needs of the industries? The answer is no!

The recruitment is too narrow.

We want recruitment also to include skilled workers

Today all technical colleges have the same objectives in mathematics, 19 objectives, and physics, 22 objectives.

These are examples on strict regulations from the Ministry of Education.

We want more independent technical colleges

Mathematics and physics must be related to each course

A realistic and practical education is only possible with close cooperation between technical colleges and the industry.

We want partnership-agreements between technical colleges and the industry

(This is possible today!)

CONTRIBUTE TO PARTNERSHIP AGREEMENTS

Federation of Norwegian Process Industries/ Prosessindustriens Landsforening (PIL) started 4 years ago partnership-agreements between technical colleges and companies. The purpose of these agreements are to cooperate in order to give the students a good knowledge of how the industries are working and what the industries expect from the engineers, what is the role of the engineers in a modern industry. This means of course technical and economical skills, but also creativity and team-work. The content of the agreement can be: - lecturer from companies – censor from companies – company-visits for students and teachers – summer-jobs in companies for students – project-work in companies – teachers participate in company-courses – teachers have courses for engineers from companies – senior engineers from companies are mentors for students. Traditionally it has been: - censors from companies – company-visits for students – summer-jobs in companies for students – project-work in companies for many years. The challenges here have been (the first step in PIL's programme for partnership): - strengthen the influence of the censors in the examination questions, make them more industry- and problem-orientated – company-visits as a part of the study plans, an example of how mathematics are used in day-to-day work of engineers – good progress in the summer-jobs. 1.year: Teamwork in a shift. 2.year: Teamwork in a project. 3.year: Project-work alone or with one or two other students – project-work in companies, getting problems from the companies. The second step in PIL's programme for partnership: - lecturer from companies – teachers participate in company-courses – teachers have courses for engineers from companies. The main purpose in this step is up-dating each other, both teachers and engineers. The third and last step in PIL's programme for partnership is: - senior engineers as mentors for the students during their studies. PIL's programme for partnership has

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achieved some part of the purpose. The programme is still going, and PIL is now, especially, working with the mentors for the students.

TAKE PART IN PROJECTS

Federation of Norwegian Process Industries is taking part in two very interesting projects.

One in county Ostfold, where skilled workers will be mixed with ordinary students from this autumn. The input is different, but the output will be the same.

The second in county Telemark, where skilled workers are in a special class only for them. Again different inputs, but the output is the same.

In both projects the standards are the same as for the ordinary students.

COOPERATE ABOUT COURSES

For 14 years Federation of Norwegian Process Industries has cooperated with the technical college of county Sor-Trondelag about courses. Courses which are needed in the process industries. These are courses for skilled workers at the same level as ordinary students. About 300 skilled workers have completed these courses with very good results. We know that this is working.