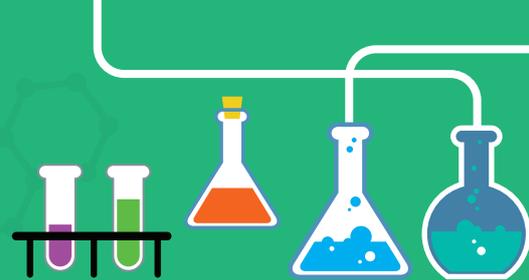




TRAWI PROJECT NEWSLETTER



WHICH SKILLS ARE THE GRADUATES OF CHEMICAL FIELDS OF STUDY MISSING?

Results of a survey that was conducted among the representatives of chemical enterprises in the Czech Republic and in Poland.

Chemistry belonged in the second half of the 20th century to sectors with high growth potential. It offered both young persons and entire regions in the Czech Republic and in Poland as well opportunities for personal development. Labour market in both countries shows in two last decades a deepening shortage of qualified young workers, who could replace the leaving generation.

The main reasons for the shortage of qualified graduates:

- demographic decline;
- missing respect for technical work and its low social appraisal (students and their parents do not find this field of study attractive);
- broken contacts between schools and enterprises;
- non-existent conception of the developments of the technical education.

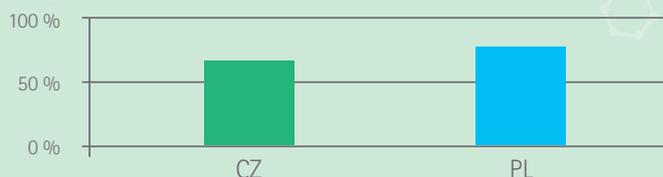


The international project TRAWI (LDV-Transfer of Innovation) could offer some solutions to the current situation. Education programmes that are better connected to the economic sector and focused on practice in the profession and that should reflect the needs of employers and companies in the chemical industry will be drawn up within this project. Therefore a survey was conducted and its results are presented in this newsletter.

CEOs (chief executive officers) or HR Directors of in total 181 enterprises (81 in the Czech Republic and 150 in Poland) were addressed via e-mail. The questionnaire was distributed also by the associations of chemical industry and other relevant institutions. A total of 41 completed questionnaires were returned (a return rate of 34 % in the Czech Republic and of 8 % in Poland). Most of the addressed enterprises are particularly active in basic chemical, plastic and the petrochemical industries. The answers from respondents indicate that companies perceive the current situation in the area of vocational training as problematic and believe that it is necessary and urgent to find an effective solution.

Representatives of the labour market lack in particular:

■ qualified workers



69 % of the surveyed organisations in the Czech Republic and 83 % in Poland have difficulties to acquire qualified employees at this time.

■ a better concordance between educational programmes and the needs of the labour market

The opinion of 41 % of respondents from the Czech Republic and 67 % of respondents from the Poland is that education/training programmes rather do not correspond to the needs of the real world of work.

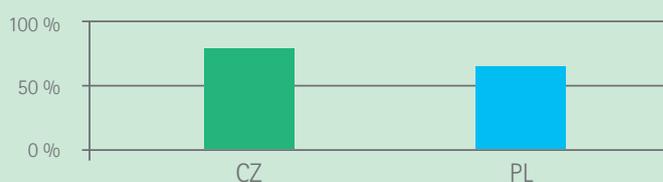
Schools and their education/training programmes and equipment are, according the respondents, often obsolete and cannot keep pace with the latest developments in the field. Respondents also indicated that there are not enough students who would be interested in chemistry-related fields of study.

■ sufficient practical training and work placement during studies

It is the belief of 69% of respondents in the Czech Republic and 83% of respondents in Poland that pupils undergo little vocational training or work placement during their studies and, for this reason, are unable to acquire sufficient practical skills

Respondents chiefly emphasise the need for experience in a real work environment, which would allow pupils to become acquainted with facilities and instruments.

■ practical skills



The fact that graduates do not have sufficient practical knowledge is pointed out by 69% of respondents in the Czech Republic and 58% of respondents in Poland.

Respondents in both countries also pointed out a number of times that secondary school graduates have poor manual skills, little desire to do manual work and poor physical fitness.

According to Czech and Polish employers, for working in a laboratory graduates lack the following competence:

- the ability to perform chemical analyses based on production and analytical documentation.

In terms of working in production, both countries most often mention two missing competencies:

- managing technological processes in chemical production and in other chemical processing industry fields;
- applying knowledge of physical-chemical principles and rules to chemical processes.

Soft Skills

In addition to vocational competencies, graduates also lack soft skills. The responses of the Polish and Czech companies to this question more or less coincide as well. Graduates lack chiefly decision-making competencies and basic work habits. Czech employers also emphasised that graduates are not sufficiently independent; conversely, Polish employers feel graduates lack the ability to work in a team.

The objective of the survey was to find out, which competences are considered by the employers as the most important.

Profile of requirements placed on graduates from the point of view of employers

The most important competency for working in a laboratory:

- the ability to perform chemical analyses based on production and analytical documents

The most important competency for working in production

- the ability to manage technological processes in chemical production and in other chemical processing industry fields (this competence was most often mentioned by the Czech companies)
- preparing and processing chemical substances and raw materials for chemical production (this competence was most often mentioned by the Polish respondents)

The most important soft skill:

- good work habits



The position of chemical industry and vocational education

Czech Republic

The chemical industry is the third largest industrial sector in the Czech Republic. Within the Czech economy and processing industry, the standing of the chemical industry has remained stable over the last few years. At the end of 2008, due to the economic crisis, revenues in the industry have fallen slightly. 2010 saw a recovery, and revenues grew by almost 27% between 2010 and 2012. In 2012, the chemical industry employed a total of 113 245 employees; the average salary in the industry was about CZK 24 950 (approx. EUR 924).

In the Czech Republic, there are 26 secondary chemistry schools in total. The number of students accepted into this field of study was relatively low in 2013, 551 students were accepted into the chemical technologist field of study (with leaving certificate). The percentage of students accepted into the first year of the mentioned category and group of fields was 1.4%. The number of students accepted into the chemical plant operator field of study (with vocational certificate) was 145.

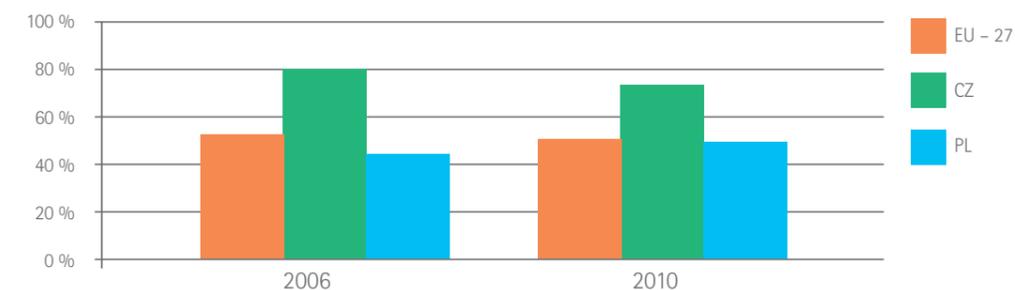
In the Czech Republic, there is a relatively great number of people who have achieved secondary vocational education, as the country has a long tradition of vocational education (47 % of all secondary school graduates obtained a leaving-certificate, 27% of all secondary school graduates obtained vocational certificate). In the Czech Republic, there has always been a great number of people with completed secondary vocational education (ISCED 3, completed either with a leaving certification or a vocational certificate). A long-term decline in interest in studying vocational fields without a leaving certificate has been registered in favour of fields concluded with a leaving certificate in the last few years. Interest in general fields of study remains steady.

Poland

The chemical branch is one of the fastest developing areas of Polish economy. This is reflected in the statistics from 2011–2012 as well as in the prognosis for year 2020. It is certain that the demand for qualified intermediate-level technical workers, but also specialists in the chemical industry and environmental protection, will continually sustain on the same high level. This is proven by the statistics from the period of time 2011–2012 that show an increased need (more than 106 %) intermediate personnel of chemical, physical and technical sciences. In this view, there are more and more the so-called "greencollars", in other words workers specialized in the field of the new renewable energies and ecological building. Furthermore, the dynamic development of petrochemicals is expected, which is connected with the increased demand for biofuels and modernized agriculture. According to the prognosis, majority of the funds in the chemical branch will be invested in the modernization, development and new technologies (cf. Rak 2012, Kocór M., Strzebońska A., Dawid-Sawicka M. 2012, UMWD 2012).

For several years more and more school leavers, who obtained general education, decide to complete the vocational education as well. In the school year 2012/2013 55% of pupils took such decision and it is 10% more than 10 years ago. This tendency was first apparent in the small and medium towns, but for some time also in a big urban agglomerations. This is confirmed by the statistic data from the school year 2012/2013 among which the number of pupils in the vocational schools in Warsaw, Cracow and Gdansk grew up about 7–11% despite of the population decline (Dziedzic, Kazimierzczak 2013).

The share of students at vocational schools in the years 2006 and 2010 in EU, Czech Republic and Poland



Good practices from Germany

The German dual system presents for both countries a rich source of inspiration. Almost 57 % of a single age-group starts with the vocational education directly after leaving a school of general education. Furthermore the demand for apprenticeship is still growing, because more and more graduates aim for additional qualifications in form of vocational schooling (provided within the dual/ apprenticeship system).

Main characteristics of the dual system:

- the schooling is realised in two places at once, in a company and at a vocational school (eventually in inter-company training centres);
- the schooling lasts from 2 to 3,5 years;

- the apprentices sign an agreement and receive an appropriate training pay from the companies (in the chemical branch the training pay for a student of the first year of the vocational education amounts to about 800 €);
- the training finishes with the oral and practical examination in front of the examining board that consist of representatives of the Chambers of Industry and Commerce.

Educational contents, regulations, etc. are formulated collaboratively by the representatives of the federal and local governments, representatives of the employers' associations and trade unions (in the chemical industry it is trade union IG Bergbau Chemie Energie).



Example of good practice

Chemical Industry Association of the Czech Republic (Svaz chemického průmyslu České republiky) is trying to promote chemistry, increase the popularity of the field and develop chemistry-related studies. Since 2013 it has been organising the national "Young Chemist" (Mladý chemik) competition. The most successful participants receive one-year scholarship at the Faculty of Chemistry of Pardubice University. In the last year took part in total 8000 pupils from 11 regions. "In this year we had a great competition: in the basic rounds participated in total, which means 3000 pupils more than in the previous year. This is great news for both – vocational schools and employers

as well. It means that chemistry is by the upcoming generation perceived as a field of study with potential that is worth studying, because it offers interesting and lucrative job positions and possibilities. The deficiency in the number of young and technical educated specialists, who we lack meaningfully at the labour market right now, could turn into the past soon," comments Ladislav Novák, the director of the Chemical Industry Association of the Czech Republic that is the general partner of the competition.



Interview with Miroslava Katzerová from High School of Chemistry Pardubice (Střední průmyslové školy chemické Pardubice)

Why is, according to your opinion, the number of students entering the school so low? Is it just a consequence of the demographic decline? The high number of participants in the competition "Young Chemist" could be seen as a sign for promising future.

I think that there exist more reasons for low numbers of students willing to study at vocational schools. Besides the already mentioned population decline should be mentioned boring and not attractive chemistry lessons at elementary schools. Teachers are not able to impress their pupils and to awake in them the needed interest for further studies. Also the legislation stating that the underage pupils are not allowed to work with chemicals played a significant role. Furthermore, laboratories vanished from most elementary schools in the past years. An unfortunately I have to confess, that the pupils who participate at the competition "Young Chemist" decide in many cases to enter other schools, mainly schools offering general education.

Could you describe activities that you carry out to increase the attractiveness of chemistry and to make chemistry popular among pupils and potential students?

We organize doors open days regularly, since 12 years we organize a correspondence competition "Why should we fear chemistry?" presenting chemistry in a form of a game and making chemistry lessons more attractive for the pupils at elementary schools. We offer a leisure time course in the laboratory. Our school participates at two projects financed by the European Social Funds: Practical training at SPŠCH and Support of the natural science and technical education in the region of Pardubice. Last but not least I have to mention our participation at the school fairs and a massive PR campaign.

Do you cooperate with companies by providing practical training or work placement?

Yes, work placements of students completing their 4-years study programs concluded with a leaving certificate are organized strictly in companies. Practical training of students who obtain vocational certificate at the end of their 3 years study programs are combined, these are organized in school (within the 1. year of the study program) and after that in companies.



TRAWI Project

(Transfer of experiences for the creation of an economy-oriented, work-based VET in the structures of school-oriented educational and training systems)

Leonardo da Vinci – Transfer of Innovation, Project Number: DE/13/LLP-LdV/TOI/147629

Based on the data obtained, the TRAWI project is to offer a solution to the mentioned problems. The product of the whole project should be methodological-didactical approaches that help schools to design practically oriented units of learning outcomes that should lead to the profile of graduates being in line with the needs of employers, both from the theoretical and from the practical points of view. Employers should automatically be included in the creation or processing of education/training programmes. The survey did show, however, that 66% of respondents in the Czech Republic and 58% of respondents in Poland were not involved in creating education/training programmes. Even the companies that work with a secondary school in the given region do not create the content of education/training programmes. Companies most often organised excursions and provide sponsorship gifts. A good sign is at least the fact that more than half of the companies in the Czech Republic and a third of respondents in Poland who answered "No" to this questions were willing to cooperate on creating a joint education/training programme that would correspond to the needs of the profession.



Project partners:

Qualifizierungsförderwerk Chemie GMBH (Germany)
Sächsische Bildungsgesellschaft für Umweltschutz und Chemieberufe (Germany)
Fundacja Kształcenia Zawodowego i Miedzykulturowego (Germany)
Národní ústav pro vzdělávání (Czech Republic)
Střední průmyslová škola chemická v Brně (Czech Republic)
Střední průmyslová škola chemická Pardubice (Czech Republic)

Associative partners:

Belgium: European Chemical Industry Council
Germany: Arbeitgeberverband Nordostchemie
Technische Universität Dresden, Fakultät Erziehungswissenschaften, Berufliche Fachrichtung Chemietechnik, Umweltschutz und Umwelttechnik
Poland: Izba Przemysłu Chemicznego
Zespół Szkół Chemicznych im. Ignacego Łukasiewicza w Bydgoszczy
Kuratorium Oświaty w Krakowie
Urząd Miasta Krakowa - Wydział Edukacji
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