SUCCESSFUL EXPERIENCE IN CHEMISTRY TEACHING IN THE CZECH REPUBLIC

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Introduction to the national situation

• Czech educational tradition is slowly followed by new innovative teaching methods and trends.

• The main teaching form is still a frontal teaching of big group of students/pupils (25 and more).

• Some teachers in Czech Republic still give information and let students be passive.

• Reportedly, the main reasons of that are the economic situation and workload of chemistry teachers and thus low teachers` motivation.
• In the frontal teaching form, **innovative components** could be successfully incorporated:
  - brainstorming,
  - mind maps,
  - students argumentation,
  - discussion,
  - ICT.

• **Cooperative teaching** (learning) is also considered as classic teaching method. This form leads students to share, cooperate and support each other. This helps to understand the curriculum.
Innovative methods in Czech science teaching

**Inquiry-based teaching (IBSE)**

- Czech educational system also follows new trends (with a slight delay).
- IBSE approaches focus on student`s inquiry as the driving force for learning.
- Teaching is organised via questions and problems in a highly student-centred inquiry process.
- Students learn to explore the problem, to ask questions, to carry out their own research and experiments from that they discover the regularities.
- Pieces of knowledge are not delivered by the teacher but found by students.
- Students gain not only new data and information but also enjoy good feelings.
- National conference SCIENTIX (organized by European Schoolnet - EUN) - practical workshops, where the participants tested a variety of innovative teaching methods in practice.
- The main goal of this conference was that each teacher took particular inspiration for his teaching.

http://www.dzs.cz/cz/eun/
**Project education**

- Project education form helps to motivate students to learn chemistry and to enhance competences like: cooperation, discussion, formulation of questions, problem solving, create and find information (competences necessary for laboratory work)

**Open education**

- Students cooperate together.
- Weekly schedule informs about compulsory work and what is voluntary.
- It is not limited to the borderline of the school.

**ICT-supported chemistry teaching**

- visualisation of information
- support of cooperative teaching forms
- of experiments enables e-learning and promotes
- support interdisciplinarity (ICT, English)

- powerpoint slides
- graphs, tables
- short videos of experiments
- virtual labs
- e-learning

Source: www.czso.cz
The Institute for Support of Innovative Education

http://www.inovativnivzdelavani.cz

• The institute supports innovative methods and trends, mediates information, initiatives for teachers, experts and schools.
• Focused on Montessori School, Waldorf School, intercultural schools, intuitive education etc.
• It provides an online portal with a list of successful schools which involved innovative teaching in their daily practice.

Innovative training of future teachers of chemistry

The aim is to allow prospective chemistry teachers to be in a close contact with pupils at primary and secondary schools through
• management of students’ projects directly in chemistry lessons,
• tutoring laboratory lessons,
• organizing Chemistry Olympiad at schools and excursions to laboratories for pupils,
• chemistry consultations for talented secondary school pupils,
• preparation of natural science competitions and popularizing events

ucitelchemie.upol.cz
Key competences and their development in chemistry education

National Education Development Programme for the Czech Republic (“White Book”)
• A new curricular system was introduced into the Czech education system (age 3 to 19).

Chemistry is included in the area „Humans and Nature“ (Physics, Chemistry, Natural Sciences, Geography)
Chemistry textbooks

Pupils and students often learn the curriculum from outdated textbooks that do not correspond with current knowledge. However, we would like to mention two successful textbooks:

- Chemistry for basic schools (8th and 9th grade by J. Škoda and P. Doulík (2006)
- Chemistry for secondary schools by J. Honza and A. Mareček (2008)

The main aim is to motivate pupils to study chemistry, not to discourage them from it.
**What is accentuated?**

- **usability** of the acquired knowledge in practice
- **interdisciplinary** relations with other subjects (not only science-based)
- support of the curriculum by **individual experiences** of pupils and their children conceptions
- importance of real and virtual **experiments**
- **direct observation**, various ways of **modelling**, **visualisation**
- **individual work** of pupils (projects, searching of information)
- **generalizing approach** (induction of general principles from concrete things, phenomena, facts and knowledge)
- **motivation** to learn chemical phenomena and processes
- considerable empowerment of the **biochemistry-related curriculum**
What is suppressed?

- mechanical memorizing of empty and useless facts
- factual approach of chemistry teaching without relation of findings with the real life
- too abstract passages of general and physical chemistry
- complex nomenclature, calculations and chemical equations without practical importance
- mutual isolation of inorganic and organic chemistry
- long commentary passages in the textbook
- understanding chemistry as theoretical and useless subject
Activities helping teachers to develop their skills

- journals and books
- conferences and lifelong learning programmes
- projects and portals
- CIAAN project

  - workshops for science teachers
  - teaching resources on the web portal
  - international conferences
Conclusions

• Innovative teaching methods are slowly introduced to Czech educational system.
• Much time and effort will be required to implement them properly.
• The implementation depends on the (not only financial) support (from school directors, local, regional and state government, legislative etc.)
• Nevertheless, we have reported some examples of good practice in chemistry teaching.

Thank you for your attention!