HOW CZECH INSTITUTIONS OVERCOME THE LACK OF STUDENTS’ MOTIVATION TO LEARN CHEMISTRY

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Actual state of the art

- There are significant problems with students` motivation to learn chemistry in the Czech Republic.
- Chemistry is considered difficult and unpopular at elementary and high schools, which causes that only few students choose chemistry as their field of study for higher education.
- Question: What are the reasons for lack of students` motivation?

Causes of motivation lack

1. Teaching methods

- Teaching is mostly conducted in too abstract terms.
- The students try to remember the facts by heart without understanding them.
- The education in chemistry classes consists in too much theoretical lecturing instead of presentation of real life examples.
- The textbooks are often old and contain abstract plain text without simple explanation.
Causes of motivation lack - continued

- Theory is preferred to practice for several reasons:
  a) low allocation for chemistry lessons
  b) lack of teachers who want to teach chemistry by different way
  c) Teachers who want to change the way of teaching are limited
     i. Many chemicals are no more allowed to use or even store in schools.
     ii. Many schools cannot afford to buy expensive chemicals and equipment.
     iii. Number of possible experiments is limited.

- Pupils and students are not only unsuccessful in chemistry but also gradually become disgusted by it and prefer other subjects for their following study and professional career.

- Pupils consider chemistry and physics as the least popular subjects.

- There is also close connection between difficulty and popularity of subjects: An easy subject is also favourite and vice versa.

- Pupils are not able to transform their abstract facts to the real situation.
Causes of motivation lack - continued

2. Unpopularity of chemistry

- Pupils first meet chemistry in puberty which is a period of resistance.
- Pursuing a career in chemistry does not appear to be “in style” for the youth.
- Nowadays, mainly the tertiary sector of economy, i.e. the service sector speeds up economics.
- Heavy industry which prevailed for decades has receded.
  a) turnover in political and economical development in 1990s
  b) demand to lower harmful emissions
  c) pressures from ecologic organizations
- Prospective students prefer humanistic branches as sociology, political science, laws etc.
- People don`t realize that chemistry is versatile and ubiquitous.
Ways to increase students` motivation

1. Teachers` approach

- Teachers would suggest more real life examples, teaching more about issues that are useful or even essential in daily life.
- Various teaching methods can be utilized, e.g. games, trans-subject project education, proper experiments.
- The teaching method is crucial for students, it is better if they learn non-violently, seemingly incidentally.
- However, innovation of teaching desires great portion of enthusiasm.
Ways to increase students` motivation - continued

2. ICT-based materials

- Usage of computers can increase students` motivation to learn chemistry.
- Even complex phenomena can be visualized via pictures, video or other applications.
- Many ICT-based teaching and learning materials are available online; however they differ a lot in topic, quality, extent, target group and purpose.
- It is necessary to review and assess the materials.
- There are only a few suitable online-available materials in Czech language.
- The offer in English is much wider, however problems occur:
  - Not every Czech chemistry teacher masters his English so much that (s)he could translate the materials for his/her students.
  - Computer translators are not sufficient because they are not able to translate the text clearly and correctly.
  - The teachers are very busy.
3. Electronic learning tools

- Several schools have been provided with modern electronic learning tools as interactive whiteboards, tablets etc.
- We assume that this could increase the attractiveness of learning for pupils and students.
- These technical innovations cannot help without quality software and newly created or adopted teaching and learning resources.
- For instance, pupils and students can simulate some chemical reactions without risk of injury.

4. International students’ exchange

- We mean that international exchange of students should be extended.
- We assume every hardworking university student should have a chance to experience study in a foreign country.
5. Popularization events

Students’ motivation can be also enhanced by popularization events, e.g.

- Lessons of Modern Chemistry
- Laboratory exercises for secondary schools
- Summer scientific camps
- Summer school and workshops for secondary school teachers
- Scientific trades (open-air fairs)
- and many others

According to our experience, it is desirable to focus mainly on teenagers at the age of 13 to 16 because this is the age when most of the teenagers form their ideas of future career.

At the last two grades of upper secondary schools, they are already decided upon their future career.
Conclusions

- Many students consider chemistry difficult and not interesting for future career.
- The reasons of this lack are of different origin, from obsolete teaching methods and tools to general unpopularity of chemistry.
- This state can be improved by employment of new teaching methods and equipment; however this is limited by costs of new tools and time and effort necessary for change.
- There are many ICT-based teaching materials; available reviews of them can help the teacher to choose the proper one.
- Students` motivation can be also enhanced by various popularization events performed by universities and other scientific institutes.
References

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Thank you for your attention!