

## Main Difficulties in Teaching Chemistry in Secondary Schools

### TEACHERS' CASE STUDY

#### Teacher's Case Study No. 4

Subjects: Chemistry, Biology  
School: Wolkenberg-Gymnasium Michendorf  
Place: Brandenburg, Germany

#### Description of the Case Study

1. What do you think are the reasons for major difficulties in learning chemistry at school?

*Cause is not the lack of facilities or equipment in schools*

*There are too many topics and materials and a depth of content that must be squeezed into too few hours per week*

*Time for practice and consolidation phases is scarce*

*Particularly at the upper secondary level the technical content is much too large, the teachers often have to teach content they have learned at that depth only at university*

*The scope and depth of the subject is no longer based on the lives of the students.*

*With that I mean: Why do the students have to know the facts of a chemical in the smallest detail? They won't need it after high school ever again, unless they study chemistry. And if they study chemistry, it would be enough if they learn in the study.*

*Not just in chemistry, but basically difficulties are due to the fact that early support is going down; to develop basic skills in preschool age (holding a pen, applying a ruler, drawing, education for order and cleanliness, training of fine motoric skills, craft skills) is extremely important; Preschool education often starts at the beginning of school and this delay continues up into the high school level.*

2. What major difficulties do you have in teaching chemistry?

*Good laboratory facilities are available and are used intensively.*

*A major problem is the lack of time and the constant pressure to do everything.*

*Choosing a type of school is a big problem: too many students who have no secondary cognitive level visit the high schools: they suffer from their failures and slow down the development of the more capable ones. On the other hand, there are many newcomers who move back from free schools to public schools – their deficits in the*

*natural sciences can usually not caught up, that is, all these students are "lost " to chemistry.*

3. What kind of courses - if any - on didactics of chemistry did you attend?  
*Chemistry and biology didactics, usually theory lectures as well as seminars.  
 I received a very interesting feedback from a trainee, who began to teach a few weeks ago: the study lacks important practical relevance, it gives students a high scientific chemistry education, however, there is no longer any training in didactic reduction. Therefore, it is very difficult to adjust to the level of "low" school thinking.  
 It would be important to have a reduced didactic seminar (that is oriented towards the curriculum of the federal state) for any scientific lecture (e.g., inorganic chemistry) at the same time : What content do I take from university into school? What is the depth to which I teach it in secondary schools or upper secondary level? How do I express myself easily, but still technically accurate in the classroom?*
4. Why do many young people quit learning chemistry and, in general, scientific studies after upper secondary school?  
*School may discourage, pupils at that age might not yet be ripe for this material depth.  
 The study may be too difficult  
 Many professors are certainly highly intelligent, but do not know how to teach.  
 Everyone who holds or gives lectures or a seminar would be required to attend a teaching training. Lectures are often confused and confusing, a common thread for the learner (student) is missing.*
5. How could young people be helped take up scientific studies after upper secondary school?  
*Answers can be found in 1-5*
6. Which initiatives has your country undertaken in this direction?  
*I do not see any. On the contrary, shortening of school education and hour reduction tin combination with retaining the already hard to manage topic load.*
7. Have you ever taken part into a research project concerning scientific learning?  
*No*
8. Could you mention any recent research you have heard of, that might be useful to our project?  
*No*
9. Could you suggest any other areas of research that might be useful to our project?  
*No*