



## More science in textbooks

In Switzerland, primary school textbooks in the natural sciences are not what they should be. Researchers would like to play a greater role in bringing science to school children - but there are big hurdles to overcome.  
*By Mathias Plüss*

It's paradoxical. For years people have kept repeating the mantra that education is Switzerland's 'only natural resource'. So year after year, billions of francs are invested in Swiss schools and universities. But in the end, what's lacking is one of the most crucial components of the educational process: good school textbooks.

The situation differs from one subject to another. But many experts are unanimous in believing that it's natural science textbooks for primary schools that are the main problem. Some of the current textbooks are "completely old-fashioned, both didactically and in their content", says the biologist Markus Wilhelm, a lecturer in the didactics of the natural sciences at the University of Teacher Education Lucerne (PH Luzern). Lucien Criblez, professor of pedagogy at the University of Zurich and a member of the Zurich Education Council, also says that there is "a great need for action". He confirms that the publishing houses themselves are aware of the situation. But it might take a while before things actually change.

### Communicating complexity

There is a textbook in the natural sciences, currently in use in the canton of Bern, that is emblematic of the current problems. It already had to be revised a few years ago because it contained serious mistakes. But the underlying curriculum is still valid until 2018, despite describing evolution as a mere 'hypothesis' and placing it on the same level as religious belief. This problematical state of affairs is a result of the amateurish approach taken to the topic in the 20<sup>th</sup> century. "In subjects such as German and maths, proven experts have repeatedly been involved in developing school textbooks", says Criblez. But this didn't happen in the natural sciences, partly because the material itself is difficult: "The more complex the material, the greater are the didactic challenges in communicating it to school pupils". And as everyone knows, the best experts aren't always the most gifted educators.

Another obstacle in Switzerland is the fact that things are done on a small scale. "Every canton has its own curriculum", says Markus Wilhelm. "That's why many cantons have developed teaching resources to suit their own needs". But limited public funding has meant that the people appointed to the task were those willing to work almost for free. These were usually committed local teachers who loved their profession - but who sometimes simply lacked the necessary expert knowledge.

Everything is going to change soon, however. For one thing, lecturers at the newly created Swiss pedagogical universities constitute a body of potential textbook authors with a sound training both in didactics and in their specific fields of expertise. And the

implementation of 'Curriculum 21' means that new textbooks are being designed that no longer have to take cantonal particularities into consideration. So the time is ripe for a qualitative leap.

### What is the real impact of textbooks?

The Swiss Academy of Sciences (SCNAT) is also aware of the problems being faced. "We're not asking for the textbooks to be written by scientists - the education experts at the pedagogical universities can do a better job", says Helmut Weissert, professor emeritus in geology at ETH Zurich and President of SCNAT's Committee for the Promotion of Young Talents. "But we'd like to have some input when it comes to questions such as: What knowledge actually belongs in a school textbook? Where did new scientific focus areas emerge in the last ten or twenty years?" Weissert believes that the people drawing up the textbooks still haven't yet opened up the doors to dialogue wide enough. Nevertheless, initial contact took place in late August 2016, when publishers, educators and scientists came together for a joint workshop in Bern.

Weissert offers a concrete, negative example from his own field. "In the curricula and textbooks, inanimate and animate nature are still kept strictly apart. But we've known for some time that biological and geological processes are closely linked to each other". In order for such crucial knowledge to enter into textbooks, it would be an important step for authors to meet with experts for a roundtable discussion before actually starting work.

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Markus Wilhelm from PH Luzern supports this suggestion. He's had very positive experiences himself. When he was writing a textbook on evolution, he made sure to take in-depth advice from the evolutionary biologist Heinz Richner from the University of Bern. "At first I thought I wouldn't need him, because I'm an expert myself", says Wilhelm. "But he gave me incredibly good advice. And in at least one particular case he prevented me from getting into hot water". But what he lacked after writing his textbook was any kind of evaluation as to whether it really had the impact that was intended. German-language school textbooks are almost never subjected to any such basic assessments.

### The difficult art of collaboration

Bruno Bachmann works at Schulverlag Plus in Bern. And when he hears the demands being made by academics, he sighs a little. "I understand that natural sci-

tists would like to be more closely involved with the development of textbooks", he says. "Factual correctness and being up-to-date are naturally also important to us". Basically, he's in agreement with the concrete suggestions being made: having discussions with experts at the start, and evaluating the textbook once it's finished.

But there are all kinds of problems in practice. "It's our experience that collaborating with university professors is difficult", he says. "Usually, they're so busy that they don't have the breathing room they need for it". And besides, there are always time constraints when developing school textbooks, while the budgets are so tight that it's often illusory to think that additional expense could ever be incurred.

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Helmut Weissert

Under Bachmann, Schulverlag Plus is currently collaborating with the publisher Lehrmittelverlag Zürich to create a new series of primary school textbooks called 'NaTech 1-6'. These books are skills-oriented and are due to be published in 2017, in good time for the introduction of Curriculum 21. "The new curriculum was agreed and confirmed in 2015", says Bachmann. "You really ought to have five to six years to develop a new textbook. But if we only publish everything in 2021, then people will once again say: We've got a new curriculum, but we haven't got the books to teach it". So 'NaTech' has been conceived in the traditional manner. There were no roundtable discussions with experts at the outset, and there'll be no proper assessment at the close. There simply isn't enough time for this, says Bachmann.

All the same, the authors - mostly education experts from the pedagogical universities - are collaborating here and there with subject experts from the universities whenever they have concrete, subject-specific questions. And this approach is intended to be expanded further. The Academies would like to create a pool of experts to whom publishers and authors can refer when they have questions, when they need counter-checks, or when they need scientific partners for more in-depth collaborations. The preliminary work for such a pool is currently being carried out.

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