How physics teachers choose a textbook

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Abstract
As a result of the reform of the Polish educational system a lot of new textbooks, e.g. about forty for junior high school (the, so called, gimnazjum) appeared. Out of this lot, the teacher must choose the one which suits him and his pupils best. This one must be correct from the scientific point of view and also should help in overcoming the problems which students encounter in understanding physics. We have shown that
1) A lot of textbooks contain serious mistakes from the physical point of view and that teachers are not sufficiently qualified to notice that. Teachers regard textbooks as a source of established and trustworthy knowledge.
2) Many teachers do not recognize their students’ difficulties. They also forget the difficulties from the time they were students themselves.
As a result they have problems in a quick assessment of the didactical value of textbooks. Only after longer use of a given textbook or after brainstorming during workshops they can better evaluate textbooks.
3) Although teachers appreciate the common language in textbooks, the difficulties created by such parlance, (misconceptions and lack of precision), are overlooked by teachers.

We would appreciate to get opinions of the participants of the conference about the situation in their countries.
I Important factors in choosing the textbooks

Four years ago our educational system has been profoundly reformed. In the new system only the basic curriculum is defined. Detailed curricula and textbooks have only to be approved by the Ministry of Education. Their number is unlimited. As a result there is a multitude of teaching programs and textbooks. For example, for the gimazjum (junior high school) more than 15 proposals are presently offered. Each one is strongly recommended and advertised by its editors, who in their marketing campaigns do not always use fair methods. It seems to be forgotten that educational books should not be treated as regular trade goods.

The teacher is facing an extremely responsible task of choosing the most suitable textbook.

Our interest was to find out which criteria were applied by the teachers when choosing the textbook. The second task was to answer the question: can we expect from teachers a proper evaluation of the scientific content of the textbooks.

We have drawn up a questionnaire, worked out and formulated for this purpose. In 2002, eighty teachers of physics in junior high schools in Southern Poland answered our questionnaire.

We have found out that factors which influenced the teachers’ decisions are:

- Individual judgment after scanning several, although not all textbooks - 70%
- participation in the editor’s presentation of the textbook - 39%
- other teachers advise - 30%
- marketing offer directed to the school by the editor - 13%
- advise of an official adviser from the educational board - 9%

The 70% fraction of the teachers who most rely on their own judgment, shows the skeptic attitude, perhaps typical for Polish people, towards any imposed opinions.

Our questionnaire indicates that the presentations organized by editors may substantially affect the teachers’ choice.

It is somehow startling that a marketing offer received at school has a stronger influence then the advise of a competent official adviser.
II Decisive virtues of a textbook as seen by teachers

Teachers responding to our questionnaire listed the following features as important for choosing the textbook (listed in order of frequency teachers pointed):

- the textbook should show physics in a practical context;
- the textbook should contain many paradigmatic problems with solutions;
- appreciated are modern graphical design and interesting photographs;
- good index and multimedia additions are very welcomed.

Only three, i.e., 4% of the responders pointed out the merit correctness of scientific content as a necessary virtue! As we understand, all other teachers take it for granted!

III Quality of physical content of textbooks not seen by teachers

The Textbook Commission of the Polish Academy of Arts and Sciences has examined the physics textbooks for the junior high schools, which their editors submitted for evaluation (seven out of fifteen). Only one of the textbooks has been distinguished as error free. Others contained errors; in some cases very serious ones. All evaluated textbooks are approved by the Ministry of Education.

This means that our teachers have to choose from textbooks of very different quality. The question is whether all of them can properly evaluate the scientific content of the textbook.

To answer these questions another investigation has been undertaken:

a) to the group of science teachers a chapter of a textbook about energy was presented and they were asked to indicate incorrect or unclear phrases. Only very few teachers identified the wrong phrases, whereas the majority described the incorrect sentences as unclear.

b) in the workshops devoted to problem solving some erroneous problems were given to the groups of physics teachers. Again, only very few of them indicated errors in the formulated problems, while the others tried in vain to solve them and blamed themselves for this lack of success.

c) the same teachers appreciated the everyday language in formulations of problems, however they did not notice that the lack of precision can be a source of misunderstanding.

d) during the workshop devoted to evaluation of four textbooks to junior high school teachers formulated many of very deep and useful remarks, comments, but not related to correctness of scientific content. Those errors were not noticed.
e) to the big group of science teachers (more than 100 persons) of elementary schools the passage from Aristotle “Physics” (Book 7, 241b, about the causes of movement) was presented as part of some textbook. Theachers were asked to comment it, to say whether they agree or disagree with presented opinion. No single persons disagree. They considered the text to be correct. (It is another story, how this fact should be taken into account in teachers and students education).

**Conclusion**

Since the teachers are those who eventually make the choice of the textbooks, their opinions are decisive for how the optimal textbook should look like. It was their pressure that caused changes of the style of old textbooks to the more attractive present ones. However, it is alarming that the physical content is not correct in too many cases. In our opinion the ministerial referees are to be blamed for that. The teachers expect absolute correctness of the textbooks approved by the Ministry of Education and our authorities should ensure it.

Another conclusion from our investigation is the following: Good textbooks can be written by a team consisting of teachers and scientists. If it is written only by teachers then they must very carefully checked by scientists. Reviewers should do their work properly.