

LETTERS AND COMMENTS**Reply to Comment by J Strnad ‘On the Karlsruhe physics course’****F Herrmann**

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Abstract

I reply to some of the questions appearing in a Comment concerning the Karlsruhe physics course raised by J Strnad (2000 *Eur. J. Phys.* **21** L33–36).

In a Comment [1] J Strnad commented on my article about the Karlsruhe Physics Course (KPC) [2]. The comment begins with 15 objections, formulated as questions. Although each of them merits a thorough discussion, it is evident that they cannot be answered in a letter and I presume that this is not expected by Strnad. (Actually, most of his objections are discussed in the literature cited in my article.) Apparently he enumerates these questions in support of a more general concern. Indeed, he concludes this first block of questions by asking: ‘Is the KPC not destructive? Is it not inconsistent with present curricula and impossible to be connected with them?’.

Indeed, compatibility with other courses seems to be a serious problem and we have been aware of it from the beginning of our work. We expected that those pupils and students who have been taught partly with our course and partly with a traditional course would run into conflicts. We have had many opportunities to observe what has happened in this situation. Moreover, the school authority supervised our in-service training activities with an attitude which can be characterised as being critical but positive. Their conclusion was the same as ours: the problems for a student who is changing in the middle of the course from one type of course to another (i.e. KPC to traditional and vice versa) are not greater than those in other subject matters, which always occur when the student is changing class or school. Finally, even when proceeding according to the traditional syllabus, we are frequently changing from one way of considering a subject to another without caring too much for compatibility.

After a citation of Feynman, Strnad asks: ‘Does not KPC introduce materialised angels?’. One can often express one fact in two different ways. For example, the same individual may be judged as generous by one person or wasteful by another. When Strnad says we are introducing materialised angels, I would say we are using models. Using models is legitimate, as it is what every teacher does continuously. Indeed, when we say, ‘imagine entropy as a kind of stuff’, we are using a model (in the written text we express this differently, as when actually teaching I like to use a pictorial language). Of course, entropy cannot flow in principle because it is not a stuff. Entropy is a variable within a theory, i.e. a mathematical concept. If we are not allowed to say that entropy can flow, then neither are we allowed to say that electric charge can flow, since electric charge is no more than a mathematical variable.

Strnad then tackles the problem of evaluation of the KPC: ‘With respect to evaluation of KPC, Herrmann is evasive.’ His observation is correct. I am evasive, and I shall remain so in the future, for several reasons:

- (a) It is evident that we cannot evaluate the KPC ourselves, because one should never evaluate one's own products.
- (b) Some other groups have been working on the evaluation of various details of the KPC, but these do not yet allow for conclusions about the general value of the approach. However a more comprehensive evaluation is under way and the first results can be expected during the course of this year.
- (c) The expectations of an evaluation should not be too high. It would be naïve to believe that an evaluation can tell us something like 'course A is 8% more efficient than course B'. To become aware of this fact, just try to answer the question of what is the efficiency, quality or some other property of another well-known and widely introduced course.
- (d) The question might arise: How can you pretend to realize a workable teaching concept without any evaluation? The answer is: The development of a curriculum is never based on what is called an evaluation in the educational sciences. For his work the developer needs immediate and detailed feedback. However, the result of an evaluation comes only after years and is often of little value for the developer. (I hope that my colleagues who are specialised in evaluation will not blame me for this judgement.) The effect is well known to us (as to any other school book author), that a motivated teacher can mistakenly take his own success for proof of the validity of his concept. How can I object? As an author you have to learn to distinguish between what would work and what would not under standard conditions, i.e. when the course is applied by a moderately motivated and moderately talented teacher, working in a school within a suburban environment. I admit that someone who is introduced to our approach by one of us may become suspicious, because we do not hesitate to advocate that what we are presenting is correct. I accept the comment that we should speak more often about the great number of concepts and details which we have rejected after a first or a second test.

I am sorry that three articles with comments about the KPC escaped our attention. I believe, however, that we merit some indulgence, since the articles had appeared in national school reviews (one of them in 1983).

Finally I must comment on some remarks of Strnad which made me somewhat speechless. He speaks of an 'aggressive promotion in Slovenia at teachers' meetings sponsored by international funds'. Indeed, in the framework of a TEMPUS project of the European Community, the KPC had been presented to Slovenian teachers. Members of the Karlsruhe group gave lectures and organised problem solving sessions, and the text book was translated. My impression was that the reception of ourselves and our proposal was very harmonious, and I did not notice any resentment, nor any perception of our work as aggressive. Even with Strnad's comment we would proceed in the same way if given another opportunity.

References

- [1] Strnad J 2000 On the Karlsruhe physics course *Eur. J. Phys.* **21** L33–36
- [2] Herrmann F 2000 The Karlsruhe physics course *Eur. J. Phys.* **21** 49–58

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"How can I object?" is the sense of this OK?