

Guest Editorial

With the growing popularity of the constructivist label, as is always the case when ideas become fashionable, there have come dilution, distortion, and, of course, protests. In this brief preface I need not deal with the misinterpretations of the constructivist orientation that have appeared in the mathematical education literature; the papers that are collected in this issue make the salient points of constructivist didactics with such precision and lucidity that misunderstanding is made difficult if not impossible. These studies, however, do much more. They go a long way towards answering the most frequently voiced complaint about radical constructivism – namely, that it may be a possible theory of knowing but has little to offer to the teaching practice in schools. Each of the papers provides several simple steps teachers can take in order to gain some access to the conceptual world of their students. Clearly, teachers will actually take these steps only if they have come to see that they are necessary. And it is in this regard that the studies reported here would seem particularly convincing.

Summaries inevitably curtail and impoverish the summarized material. I want to emphasize, therefore, that the few points I am mentioning here in no way reflect the richness of ideas presented by the authors. They merely seem to me to be points in common and, indeed, points that are indispensable if the teaching of mathematics and the relevant educational research are to be productive.

John Locke wrote 300 years ago that reflection upon one's own mental operations is one of the two sources of knowledge. The other source is the manifold of sensory signals. Mathematics, as Hersh more recently stated, does not concern pencil marks or chalk marks, not physical triangles or physical sets, but ideas (which may be represented or suggested by physical objects) (1979/1986, p. 22). And ideas are both the material and the result of reflection. All our authors agree that an indispensable part of teaching mathematics is the fostering of reflection in students, and they suggest ways and means to achieve that goal.

Several ways of inducing reflection are illustrated in the six studies. To encourage students to talk about what they are doing, and to explain why they are doing it, is the agreed pre-requisite, and some of the recounted teaching episodes demonstrate not only how this can be done but also how the conventional attitude of teachers precludes it.

To engender reflective talk requires an attitude of openness and curiosity on the part of the teacher, a will to listen to the student, which is clearly manifested in these studies. Consequently, they all concur that it is one of the primary duties of the teacher to create an atmosphere in the classroom that not only allows but is also conducive to conversation, both between student and teacher and among students.

Much more could be said about these six papers, but I shall end by highlighting what, to me, is the most encouraging point. Here are clear demonstrations of the enormous benefit reaped by student and teacher if both begin to take the other seriously, as a thinking human

being and as an honest helper respectively. This, I would suggest, is what some of the authors have in mind when they speak of enhancing the social climate of the classroom. It involves the basic presupposition that students are intent upon making sense of their experiences, that they succeed more often than they are given credit for, and that the sense they make for themselves must be understood and respected before any attempt to modify it will pay off. This, indeed, is not a new discovery, but the constructivist theory of knowing provides an explicit epistemological basis for it that the educational practice of the preceding era did not have.

REFERENCES

Hersh, R-: 1979, Some proposals for revising the philosophy of mathematics, *Advances in Mathematics*, 31; reprinted in T. Tymoczko (ed.): 1986, *New directions in the philosophy of mathematics*, Birkhäuser, Boston/Basel/Stuttgart, pp.9-28.

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