**Zeitschrift:** L'Enseignement Mathématique
**Herausgeber:** Commission Internationale de l'Enseignement Mathématique
**Band:** 11 (1965)
**Heft:** 4: L'ENSEIGNEMENT MATHÉMATIQUE

**Artikel:** PRIORITIES AND RESPONSABILITIES IN THE REFORM OF MATHEMATICAL EDUCATION: AN ESSAY IN EDUCATIONAL METATHEORY
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**Kapitel:** IV. TWO CONCLUDING REMARKS
**DOI:** https://doi.org/10.5169/seals-39981

able ratio between effort and reward, between the intrinsic interest or importance of the insights gained, and the amount of work that is necessary in order to gain them. A sound education cannot consist in shooting with cannons at pigeons. Yet, if you look even at the exceedingly ambitious syllabus in group theory contained in the OECD-synopses, you will find, I believe, that the syllabus for the first two years hardly contains one result of genuine and obvious intrinsic interest.[1]) As to the question of feasibility, it resolves itself into two questions: Are any given proposals at all feasible, under realistic criteria of success ? But also: if they are intrinsically feasible, what is the price that must be paid—in particular, the price in terms of teaching time, and in terms of segregation of students by ability and vocational interests ? Is this a price that we are willing to pay ?

## IV. Two concluding remarks

A large share of the responsibility for the soundness of the reform-movement in mathematical education rests upon the mathematical community; this includes both the concern for the intrinsic mathematical quality of any proposals that are being advanced, and the willingness to pursue a constructive dialogue with those outside the mathematical community who share a legitimate interest in the shaping of mathematical education.

In order that this heavy responsibility be adequately discharged, I would like to suggest the following.

Thesis 19.

*The International Mathematical Union should consider preparing, after wide debate, a statement of guidelines and basic principles for the process of reforming mathematical education. The statement should not deal with the details of any possible reforms, but with such matters as: procedures for the elaboration of proposals, standards for publication, standards for evaluation,*

1) A notable example which does not leave room for this criticism was presented at the colloquium by Professor H. G. Steiner, Muenster-Westfalen.

*ways and means for ensuring the widest international exchange of ideas and experiences, both within the mathematical community and with those outside.*

The most crucial single factor for sound teaching of mathematics is and remains the *teacher.* The key alternative before us, transcending by far in importance the alternatives between various programs or approaches, it this one: Whether the teaching community at large consists of highly and broadly educated, very competent men and women, with independent, mature judgment, a broad and informed awareness of the issues involved in their teaching, and a keen desire to learn and to experiment; or whether it consists of narrowly and superficially educated, intellectually timid, men and women of limited intelligence, with little grasp on the issues underlying their teaching, little ability and zest for the exercise of independent judgment, little autonomy in the face of the claims of authority—and little genuine intellectual fire to communicate to their students.

Nothing could be more surely destructive of mathematical education than the disappearance of first-rate teachers.

The most disquieting trend to-day is the tendency to accept that first-rate minds will no longer become teachers. It is significant, for instance, to read that in England the recruitment of first-class mathematics graduates into the schools is practically ceasing, and to read at the same time that in that country the most creative young people tend to go into Arts, not into Science.

A major concern of everyone concerned with mathematical education should be this one, therefore: How to ensure a continuing supply of truly distinguished teachers to the schools. Partly, this is a matter of external factors, which may not be disregarded: salary, teaching loads, status, independence. But partly, it depends on the nature of the teaching process itself, and on that of the process of reform. The more formal and predetermined the teaching, the more narrowly vocational and technical, the less open towards wider vistas of the mind and the more confined to the introductory chapters of university mathematics—the smaller the likelihood that a truly intellectually distinguished person will choose that teaching as a life-

long commitment. Similarly, the more prestructured any reforms, the more narrowly directive and the more obviously predicated on the teacher's ignorance and lack of ability—the greater the likelihood that a potential teacher worth his salt will not submit to the requirement of carrying out these reforms on such terms, even if this means leaving the teaching profession altogether.

It is fitting to devote my last thesis to the teacher:

Thesis 20.

*No single issue is more important, in the teaching of mathematics as in education generally, than that teachers should be men and women of genuine intellectual distinction. An over-riding concern, in the shaping of the teaching of mathematics, must therefore be whether any proposals made will tend to attract or to repel, to challenge or to stifle, to stimulate or to discourage, to reward or to punish truly distinguished and creative teachers. Every one of the parameters which influence the recruitment of such teachers —including selection, training, salary scales, teaching loads, class sizes, independence...—must be a legitimate concern of those who care for excellence in the teaching of mathematics.*

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*La rédaction a le regret d'annoncer que le Professeur A. Wittenberg est décédé le 20 décembre 1965 à Toronto.*