TEACHER TRAINING WITH AN ALGORITHMIC APPROACH

Pentelényi Pál
Budapesti Műszaki Főiskola, Bánki Donát Gépészmérnöki Főiskolai Kar, Mérnökpedagógiai Intézet, Budapest
Pentelenyi.Pal@bgk.bmf.hu

Keywords: algorithmic awareness, algorithmic thinking

The ability of algorithmic thinking appears as general competence in today's technical professional practice. Technical teacher training is also trying to satisfy the needs arising on the one hand at the secondary level of vocational training and, on the other, from the expectations of technical practice.

Research goals:

- To explore the possibilities of the formation and development of algorithmic thinking outside the scope of computer studies and IT.
- To analyse the effects of algorithmic thinking on the teaching process as well as the theoretical methodological consequences of algorithmic thinking.
- To elaborate proposals for the means and practical methods of the realisation.

Methods:

- The evolutionary examination and analysis of the curriculum of IT.
- The comparative analysis of tools for algorithm describing.
- The examination of algorithm construction in problem solving on the basis of technical literature, analysis, and independent projects.

Results: My examination and analyses support the following statements:

It is essential for prospective teachers – irrespective of their chosen majors – to be in possession of appropriate programming skills and the ability of algorithmic thinking. In the construction of flowcharts to aid the solution of longer and more complex problems, the application of modularisation, of the "buildingblock principle", is indispensable, and it can be enforced as a kind of analogy to the method of structured programming. Having explored the effects on the teaching process and the methodological consequences of the algorithmic approach, it has been proved that these can be summarised in the inevitable and automatic effectiveness of the systemic approach. It is not the teaching of complete algorithms that we should aspire to, but rather the drilling of a routine in the process in which an algorithm is created. The cognitive theories of problem solving can be extended to algorithmic problem solving, too. Through analogical problem solving, algorithmic thinking contributes to the extension of algorithmic approach in the framework of the entire teaching-learning process.

Consequences: In the framework of technical teacher training it is advisable to prepare prospective secondary school teachers for this approach and for the need to hand down this approach. In the course of in-service teacher training, already practising teachers may acquire the possibly missing basic (primarily algorithmic) skills in programming and algorithmic thinking.