Informatics concepts in secondary school education: What should we teach?

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Abstract
This paper deals with informatics and/or information technology in secondary school education. Since its introduction, either as a separate subject or in an integrated way, the question about its contribution to general education still stays open and finds new responses. Many researchers agree that algorithms and programming are key concepts in informatics education. However, which further concepts must be included in a comprehensive informatics curriculum and how can we find a balance between theoretical informatics fundamentals and application levels? Finding a common model would help to achieve better results in informatics education on an national and international level. It is important to provide students with skills in using computer technologies and understanding them as well. Finally, results of a survey of Lithuanian informatics teachers' opinions on topics informatics at school level are presented. The paper concludes with a proposal to harmonize informatics contents on a transnational level.

Keywords
Informatics concepts, informatics fundamentals, teaching informatics, informatics curriculum, information technology

INTRODUCTION
in the early 1980s, many countries introduced Informatics as a school subject. Its development is characterized by permanent changes in hardware, software, didactical approaches and key topics of informatics. Moreover, this varies from country to country considerably.

Informatics as a separate subject in comprehensive schools was taught in the majority of East European countries, where fundamental and academic trends of teaching are more prevalent up till now. Lithuania also falls under this category. Here, informatics was introduced in 1986 in all types of secondary schools. As a compulsory or partly compulsory subject it has been implemented Belarus, Bulgaria, Czech Republic, Latvia, Poland, Romania, Russia, Slovak Republic, Hungary, Germany, and other countries (Sendova, Azalov, Muirhead, 1995; Hawkridge, 1996). The course is changed permanently. At the beginning teaching about computers and training of programming skills got more attention, while nowadays a shift to the practical use of ICT (-applications) for teaching and learning can be observed.

In today's world all the countries pay a rising attention to the ICT implementation in education (OECD, 2001; OECD 2010; OECD/PISA 2010). Those countries which have informatics as a separate subject usually treat ICT as a part of it; however, most of the time in the teaching process is assigned to the technology itself, and less for supporting the process of learning. Emphasizing the new course of "applied"