

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Switzerland

John C. Mitchell

Stanford University, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

Oscar Nierstrasz

University of Bern, Switzerland

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

University of Dortmund, Germany

Madhu Sudan

Massachusetts Institute of Technology, MA, USA

Demetri Terzopoulos

New York University, NY, USA

Doug Tygar

University of California, Berkeley, CA, USA

Moshe Y. Vardi

Rice University, Houston, TX, USA

Gerhard Weikum

Max-Planck Institute of Computer Science, Saarbruecken, Germany

Roland T. Mittermeir (Ed.)

From Computer Literacy to Informatics Fundamentals

International Conference on Informatics in Secondary Schools –
Evolution and Perspectives, ISSEP 2005
Klagenfurt, Austria, March 30 - April 1, 2005
Proceedings



Springer

Volume Editor

Roland T. Mittermeir
Universität Klagenfurt
Institut für Informatik-Systeme
Universitätsstr. 65-67, 9020 Klagenfurt, Austria
E-mail: roland@ifi.uni-klu.ac.at

Library of Congress Control Number: 2005922177

CR Subject Classification (1998): K.3, K.4, K.8

ISSN 0302-9743

ISBN 3-540-25336-X Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media

springeronline.com

© Springer-Verlag Berlin Heidelberg 2005
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper SPIN: 11407003 06/3142 5 4 3 2 1 0

Preface

Twenty years ago, informatics was introduced as a compulsory subject in Austrian secondary schools. During this period informatics has experienced drastic evolutions and even some shifts of paradigms. This applies to an even larger extent to the didactics of informatics.

ISSEP - Informatics in Secondary Schools, Evolution and Perspectives - takes stock of how the developments in the field are reflected in school throughout Europe. Teachers of informatics at secondary schools as well as educators of such teachers propose innovative methods of instruction, discuss the scope of overall informatics instruction, and discuss how innovative concepts can be disseminated to students in education as well as to active informatics teachers.

Due to the penetration of information technology into society at large and into schools in particular, the relationship between informatics and education leading to general computer literacy or to the use of IT-based approaches in conventional subjects, e-learning in school, is an evident focus of many contributions.

According to the broad scope of the conference its proceedings are split into two volumes. This volume, *From Computer Literacy to Informatics Fundamentals*, covers papers reporting on national strategies of informatics instruction and their evolution in accordance with the penetration of information processing equipment in our daily life. In one way or another, these strategies strive to accommodate the needs of basic skills in information and communication technology (ICT) with educational principles that can be conveyed by informatics instruction in a traditional sense. Hence, the papers on national strategies are complemented in two ways: firstly, by contributions that strive to identify fundamental issues, informatics can contribute to the general education process of the youth; and, secondly, by papers presenting approaches on how to link or even to combine instruction about such informatics fundamentals with the need to introduce pupils to the productive use of ICT. The other ISSEP volume, subtitled *Innovative Concepts for Teaching Informatics*, addresses specific didactical models for teaching informatics as well as models of teaching using ICT [1]. Its scope ranges from teacher education via ethics and self-controlled learning to various facets of e-learning.

Out of 51 submissions from 10 countries the program committee selected 16 contributions for publication in this volume. Each paper was reviewed by at least three members of the program committee. The reviewing process and the ensuing discussion were fully electronic.

Thus, this volume, though consisting mainly of contributed papers, is nevertheless the result of an arrangement of papers that aimed in their final versions to specifically contribute to the facet of the program for which they were accepted. The editorial introduction shows how they contribute to the various facets of the conference.

A conference like this is not possible without many hands and brains working for it and without the financial support of gracious donors. Hence, I'd like to thank particularly the members of the program committee, notably those who were keen to review late arrivals or to provide additional help in conflicting situations. Special thanks are also due to the organizing committee led by Peter Micheuz, to Annette Lippitsch for editorial support and administration, as well as to Karin Hodnigg for operating the electronic support of the conference.

The conference was made possible due to the support of several sponsors whose help is gratefully acknowledged. Printing and wide distribution of the two volumes of proceedings was particularly made possible due to a substantial contribution by the Austrian Federal Ministry of Education, Science, and Culture; I'd like to single out particularly Dr. Anton Reiter for his dedicated efforts and creative inputs.

Finally, hosting of the conference by Universität Klagenfurt is gratefully acknowledged. Its facilities and the beautiful surroundings of Carinthia provide the proper setting for a successful event.

January, 2005

Roland Mittermeir

1. Micheuz P., Antonitsch P., Mittermeir R.: Informatics in Secondary Schools – Evolution and Perspectives: Innovative Concepts for Teaching Informatics, Ueberreuter Verlag, Wien, March 2005.

Table of Contents

| | |
|---|----|
| Introduction <i>Roland T. Mittermeir</i> | 1 |
| 20 Years of Informatic in Austrian Secondary Schools | |
| Incorporation of Informatics in Austrian Education: The Project “Computer-Education-Society” in the School Year 1984/85 <i>Anton Reiter</i> | 4 |
| 20 Years of Computers and Informatics in Austria’s Secondary Academic Schools <i>Peter Micheuz</i> | 20 |
| Informatics Education at Vocational Schools and Colleges in Austria <i>Martin Weissenböck</i> | 32 |
| National Perspectives | |
| The Transition from School to University: Would Prior Study of Computing Help? <i>Martyn Clark, Roger Boyle</i> | 37 |
| Informatics and ICT in Polish Education System <i>Ewa Gurbiel, Grazyna Hardt-Olejniczak, Ewa Kolczyk, Helena Krupicka, Maciej M. Syslo</i> | 46 |
| Teaching Information Technology in General Education: Challenges and Perspectives <i>Valentina Dagiene</i> | 53 |
| Educational Standards in School Informatics in Austria <i>Christian Dorninger</i> | 65 |
| Russian Educational Standards of Informatics and Informatics Technologies (ICT): Aims, Content, Perspectives <i>Aleksandr A. Kuznetsov, Sergey A. Beshenkov</i> | 70 |
| The Present-Day Tendencies of Teaching Informatics in Ukraine <i>Oleg Spirin</i> | 75 |

Study of Information Search Systems of the Internet
Yuri Ramsky, Olga Rezina 84

Fundamentals Versus ICT

Why Teach Introductory Computer Science? Reconciling Diverse Goals
and Expectations
Jürg Nievergelt 92

Teaching: People to People - About People
A Plea for the Historic and Human View
Laszlo Böszörményi 93

Preparatory Knowledge: Propaedeutic in Informatics
Susanne Loidl, Jörg Mühlbacher, Helmut Schauer 104

A Pragmatic Approach to Spreadsheet Training Based Upon the
“Projection-Screen” Model
Karin Hodnigg 116

A Strategy to Introduce Functional Data Modeling at School Informatics
Markus Schneider 130

Informatic Models in Vocational Training for Teaching Standard
Software
Siglinde Voß 145

Evolving Boxes as Flexible Tools for Teaching High-School Students
Declarative and Procedural Aspects of Logic Programming
Bruria Haberman, Zahava Scherz 156

The Role of ICT and Informatics in Austria’s Secondary
Academic Schools
Peter Micheuz 166

Informatics *Versus* Information Technology - How Much Informatics Is
Needed to Use Information Technology - A School Perspective
Maciej M. Syslo, Anna Beata Kwiatkowska 178

Standard Software as Microworld?
Peter K. Antonitsch 189

The Future Is Mobile - Education Meets Mobile Communication
Werner Wiedermann 198

Author Index 203