

Informatics in Higher Education

**Come and visit the
IT & Applied Computing Resource Centre:
www.IT-CH.com**

IFIP – The International Federation for Information Processing

IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP's aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- the IFIP World Computer Congress, held every second year;
- open conferences;
- working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is less rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is in information may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.

Informatics in Higher Education

Views on informatics and non-informatics curricula

**IFIP TC3/WG3.2 International Conference on
Informatics (computer science) as a Discipline and
in Other Disciplines: what is common?
17–20 August 1997, Enschede, The Netherlands**

Edited by

Fred Mulder

*Faculty of Engineering
Open University, Heerlen
The Netherlands*

and

Tom van Weert

*Director of School of Informatics
University of Nijmegen
The Netherlands*



SPRINGER INTERNATIONAL PUBLISHING, CHAM

First edition 1998

© 1998 IFIP International Federation for Information Processing

Originally published by Chapman & Hall in 1998

Softcover reprint of the hardcover 1st edition 1998

ISBN 978-1-5041-2933-6 ISBN 978-0-387-35166-7 (eBook)

DOI 10.1007/978-0-387-35166-7

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission in writing of the publishers. Applications for permission should be addressed to the rights manager at the London address of the publisher.

The publisher makes no representation, express or implied, with regard to the accuracy of the information contained in this book and cannot accept any legal responsibility or liability for any errors or omissions that may be made.

A catalogue record for this book is available from the British Library

 Printed on acid-free text paper, manufactured in accordance with ANSI/NISO Z39.48-1992 (Permanence of Paper).

CONTENTS

Introduction	vii
Part One Discussion Papers	
1 Towards informatics as a discipline: search for identity <i>F. Mulder and T.J. van Weert</i>	3
2 Informatics education: trends, problems and the future <i>A.J. Turner, J. Hughes et al.</i>	11
3 A common core of concepts for informatics majors <i>D.K. Lidtke, P. Myers et al.</i>	17
4 A common core of concepts for informatics majors <i>M. Grandbastien, R.J. LeBlanc et al.</i>	21
Part Two Full Papers	
5 Computing and education at the university level <i>L.N. Cassel</i>	29
6 Teaching informatics to nonprofessionals: why, what and how? <i>C. Duchâteau</i>	43
7 Informatics: the core and the presentation <i>H. Geissinger, P. Ho and K. Robinson</i>	54
8 Teaching introductory computer science as science of information <i>G.K. Gupta</i>	64
9 Marketing programming to nonprogrammers <i>P. Juliff</i>	73
10 Meeting the needs of industry: a bold new curriculum in information science <i>D.K. Lidtke and M.C. Mulder</i>	83
11 Specifying and comparing informatics curricula through UCSI® <i>F. Mulder and A.E.N. Hacquebard</i>	97
12 Computer science education in Japanese universities <i>H. Ohiwa, N. Takahashi and T. Kado</i>	111
13 Computer science education at the cross-roads <i>K. Robinson</i>	120
14 Introduction to computing: a course in computer science fundamentals <i>R.L. Shackelford and R.J. LeBlanc, Jr.</i>	127
15 Representing a body of knowledge for teaching, learning and assessment <i>D. Sheridan and D. White</i>	139
16 Trends in teaching informatics <i>A.J. Turner</i>	148

17	European Informatics Skills Structure (EISS) <i>P.J.T. van der Kamp</i>	156
18	Profiles of informatics graduates as demanded by the market <i>H. van Leeuwen and D. Smeets</i>	168
19	Use and misuse of taxonomies of learning: integrated educational goals in computer science curricula <i>J.J.G. van Merriënboer and E.M.A.G. van Dijk</i>	179
20	Informaticians and informatical professionals: a conceptual framework <i>T.J. van Weert</i>	190
21	Informatics in curricula for noninformatics students: engineering and science <i>R. Vollmar and J. Gruska</i>	203
22	Informatics for noninformatics majors <i>S. Waligorski</i>	212
23	A taxonomy for computer science <i>H. Wupper and H. Meijer</i>	217
Part Three Short Papers		
24	Learning from other disciplines: pedagogic models within computer science and from elsewhere <i>S. Fincher</i>	231
25	Classifying information systems education by method engineering <i>K. Lemmen, F. Mulder and S. Brinkemper</i>	235
26	Impacts of interdisciplinary dialogue to computer science education <i>V. Meisalo, E. Sutinen and J. Tarhio</i>	241
27	Internet-studies communication and information technology (CIT) <i>S.E. Schubert</i>	245
28	Collaborative work on informatics education of noninformatics students: a pilot project proposal <i>E.W. van Ammers</i>	249
	Index of contributors	253
	Keyword index	255

INTRODUCTION

These proceedings are the result of a working conference of Working Group 3.2 (University Education) of the International Federation for Information Processing (IFIP). Its title was: "Informatics (computer science) as a discipline and in other disciplines: what is in common?"

It took place in an excellent setting: the Faculty of Informatics of the University of Twente in the Netherlands. A working conference like this one allows in-depth treatment of the conference theme by selected experts in the field coming from all over the world. The result is presented to you in these proceedings.

This book is of interest to teachers of informatics (computing science) in higher education, both in informatics programmes and in other disciplines. And also for curriculum designers dealing with informatics curricula or curricula in other disciplines involving informatics.

The first theme in the book is the discipline of informatics itself. It is considered to be a merge of what traditionally (at least in the USA) is called computer science, computer engineering and information systems. The number of informatics studies and educational programmes has rapidly grown all over the world. The spectrum by now is very broad, varying from generalized to more specialized contents, from theoretical to more applied programmes, and from monodisciplinary to multidisciplinary approaches. The question is: What is informatics precisely and how do we teach this?

The second theme in the book deals with the relation between informatics and other disciplines at the higher education level. All disciplines are undergoing profound changes because of informatics and its related Communication and Information Technology (CIT). The question is: What informatics concepts, methods and techniques form the hard core needed in every other discipline?

These proceedings have three parts in which both themes are addressed:

Part 1 Discussion papers (an editorial paper and focus group reports developed during the conference).

Part 2 Full invited papers

Part 3 Short papers

We thank the Programme Committee for developing a programme which resulted in such an interesting book.

Fred Mulder
Tom van Weert

PROGRAMME COMMITTEE

- Tom van Weert, Netherlands (Chair)
- Fred Mulder, Netherlands (Vice-Chair)
- Monique Grandbastien, France
- Anneke Hacquebard, Netherlands
- Peter Ho, Australia
- Gerrit van der Hoeven (Chair Organizing Committee), Netherlands
- Doris Lidtke, USA
- Ken Robinson, Australia
- Joe Turner, USA
- Jan Zabrodzki, Poland