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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 also 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 about information processing 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.

Don Passey Arthur Tatnall (Eds.)

# Key Competencies in ICT and Informatics

Implications and Issues for  
Educational Professionals and Management

IFIP WG 3.4/3.7 International Conferences  
KCICTP and ITEM 2014

Potsdam, Germany, July 1-4, 2014

Revised Selected Papers



Springer

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# Preface

The papers in this book were selected from those presented at the International Federation for Information Processing (IFIP) conference: “Key Competencies in Informatics and Information and Communication Technologies (ICT),” held in Potsdam, Germany, in July 2014. After the conference each author was given an opportunity to improve their paper, based on conference feedback, before publication in this book. All papers were initially peer reviewed for presentation at the conference and the final improved versions were peer reviewed again prior to publication.

While the theme of the IFIP Technical Committee 3 (TC3) education conference was on “Key Competencies in Informatics and Information and Communication Technologies (ICT),” both strands of Working Group 3.4 (Professional and Vocational Education in ICT) and Working Group 3.7 (Information Technology in Educational Management) within the conference focused more specifically through their areas of interest on Key Competencies for Educating ICT Professionals, Key Competencies Learning and Life Transitions, Key Competencies and School Management, and Educational Stakeholders and Key Competencies.

Twelve papers relating to the WG3.4 strand, “Key Competencies for Educating ICT Professionals,” were selected for this book.

In the first of these papers, Holvikivi notes that the ICT profession is extremely international, as are ICT students. She describes cognitive differences in multinational study groups and explores ways to overcome some of the differences. Lecomber and Tatnall then examine education and training issues in project management for ICT professionals, considering the place of the two main project management approaches: PMBoK and PRINCE2. Williams, Černočová, Demo, and Younie describe a working model for teacher training in computing through the “Literacy from Scratch Project.” Rocchi next examines the theoretical basis and two “mythical” statements regarding computer science as a discipline. Ruohonen, Mäkipää, and Kamaja then investigate issues relating to “offshoring” of software development and competencies, and work practices for dynamic distributed software development in global value networks. A developing country perspective of enterprise architecture skills by Shaanika and Iyamu explores how and where these skills can be developed and what constitutes competency.

Opel and Wellesen present an analysis of real-life working processes, competencies and operational fields for usage in vocational ICT education. Learning styles of students in computer science are discussed by Loay Talib Ahmed Al-Saffar, who also considers necessary changes in teaching methods to reduce student dropout and offer better learning. Haukijärvi presents a case study and evaluation of the eLearning Maturity Model in a university. Vendruscolo and Behar then attempt to identify relevant educational elements in the development

of accounting professor competencies in distance education. iPads in education and professional learning with mobile technologies are discussed by Keith Turvey, who notes the potential of these technologies to “disrupt” established practices in ways that require adaptation if educators are to harness their potential. The final paper in this section is by Iyamu, who presents the South African experience on breeding ICT skills for industry.

Papers from the Working Group 3.7 strand focused on the theme of “Information Technology in Educational Management (ITEM)” and brought together findings from research, practitioner, and policy areas that explored three main themes:

- Key competencies, learning, and life transitions
- Key competencies and school management
- Educational stakeholders and key competencies

Within each of these three main themes, current practice, development, and research outcomes have been highlighted by researchers, developers, and practitioners from across the world, giving a rich picture, not only of the current position and context in a range of situations, but also highlighting key challenges and issues that are worthy of further research exploration and development.

The theme of “Key Competencies, Learning, and Life Transitions” offers a set of seven papers providing complementary perspectives concerned with ways that different groups in life transitions are concerned with using digital skills and competencies, and how these are having impacts upon their needs and practices. Passey provides a contextual picture for the field of life transitions, defining the field for the reader, and generating a framework of factors that influence life transitions, through which to explore research and practice dimensions, both in terms of digital competencies, and in terms of associated features and skills. Rogers focuses on the motivational factors concerned with life transitions, and draws particular attention to the need to reconsider the polarizing concern with seeking intrinsic rather than extrinsic motivation, pointing more to the need to develop adaptability to support those in life transition arenas. Cranmer explores frameworks that identify digital competencies that individuals now need, and considers how those in life transitions between school and college are affected by the need for digital competencies. Lim and Lee Siew Hoong focus on the ways that a specific digital technology is being used to develop knowledge sharing practices within a commercial setting, where employees are concerned with a life transition within their employment practices. Lee Siew Hoong and Lim further consider this life transition arena, relating experiences from how a knowledge management system has been integrated into commercial practice, and the fundamental importance of factors that go beyond digital skills. Passey, in concluding this section, draws on the framework constructed from across the evidence of the entirety of papers in the section, and considers how this framework can be used to explore needs of individuals in specific life transitions, how digital technologies might support them, and what future research is needed to underpin our deeper understanding of the processes where individuals,

supporters, and digital technologies work in harmony to generate positive outcomes for all concerned.

The theme of “Key Competencies and School Management” offers a set of five papers providing perspectives concerned with how teachers and managers in schools are handling digital technologies, and implications for their key digital competency and skill needs. Banzato considers how teachers are taking on board practices of digital storytelling with learners, and concludes that while digital skills are necessary, that curriculum concerns may play a larger role in determining use of these practices. Celep and Tülübaş consider, in a different context, the effect that school leadership has on attitudes of teachers to take on board digital technologies, and conclude that the positive effect of leadership in this respect is not as clear as the effect of overarching government or ministerial policies. Celep, Konakh, and Kuyumcu explore how teachers are taking social networking sites on board in their practices, and conclude that major existing social networking sites are most commonly used in the population they studied, but moving to using these to support curriculum and school communication needs is far from common. Tatnall and Tatnall report on the ways that management information systems are being deployed and used in a single school setting, indicating the ways these are supporting teachers and managers. By contrast, Castro and Soares report on the challenges, issues, and perceived benefits that school managers identify when considering past and future management information systems.

The theme of “Educational Stakeholders and Key Competencies” offers a set of four papers providing perspectives concerned with ways that specific stakeholders in education (students, teachers, managers, and parents) are being involved increasingly in using digital technologies, and implications for their digital competency. Osorio and Nieves explore in the higher education sector how digital competencies are being described in terms of student requirement, but their evidence indicates that using these in the context of other skills that have a longer-term focus on employment are more likely to be successful. Schulz and Jeske take a different perspective, exploring how data analyses from online uses by students can be used to develop ways to differentiate between learning approaches, and the implications that this may have for teacher and student stakeholders. Strickley explores a development that supports other stakeholders – teachers, parents, and students – and indicates how digital technologies are supporting easier access to data and support, which removes stigma concerned with social status or level. Strickley, Bertram, Chapman, Hart, Hicks, Kennedy, and Phillips describe a development that enables parents to have access to indicators when they are seeking schools for their children, and the approaches they have taken in order to enable easier review by that key stakeholder group – parents.

In summary, these papers provide a range of evidence from many countries around the world, but giving a picture overall that indicates:

- Digital technologies are now being considered as a medium to support specific groups with learning needs – for those in life transitions. However, how the

potential range and depth of digital competencies and skills can be developed and handled by those in transition is a question that is yet to be answered.

- A diversity of digital technologies is being adopted and trialled by school teachers and managers for curriculum, communication, and management purposes. However, how the current factors that are preventing more common and wider adoption of these technologies, and the development of digital competencies and skills to support them, is not yet fully known.
- Digital technologies are being developed and adopted by an increasing range of stakeholders. How these developments will take shape in the future, and what their implications will be for the digital competency and skill of these stakeholders (students, teachers, managers, and parents), is not yet known.

Overall, what is clear from this range of papers is that digital skills and competencies alone are not enough to develop future practice; a deeper understanding of associated skills and competencies is needed if the digital technologies are to support those who can benefit from them most.

July 2014

Don Passey  
Arthur Tatnall



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# Table of Contents

## Key Competencies for Educating ICT Professionals

Building Basic Competences for Culturally Diverse ICT Professionals . . . <i>Jaana Holvikivi</i>	3
Project Management for IT Professionals: Education and Training Issues . . . . . <i>Angela Lecomber and Arthur Tatnall</i>	12
A Working Model for Teacher Training in Computing through the Literacy from Scratch Project . . . . . <i>Lawrence Williams, Miroslava Černočová, G. Barbara Demo, and Sarah Younie</i>	25
Questioning Two Myths in Computer Science Education . . . . . <i>Paolo Rocchi</i>	34
Competencies and Work Practices for Dynamic Distributed Software Development in Global Value Networks . . . . . <i>Mikko Ruohonen, Marko Mäkipää, and Pekka Kamaja</i>	42
Developing Enterprise Architecture Skills: A Developing Country Perspective . . . . . <i>Irja Shaanika and Tiko Iyamu</i>	52
Analysis of Real-Life Working Processes, Competencies and Operational Fields for the Usage in Vocational IT Education - Results of an Empirical Study Based on Job Offers . . . . . <i>Simone Opel and Axel Wellesen</i>	62
Learning Styles of Students at the Department of Computer Science – University of Potsdam . . . . . <i>Loay Talib Ahmed Al-Saffar</i>	68
E-learning Maturity Model – Process-Oriented Assessment and Improvement of e-Learning in a Finnish University of Applied Sciences . . . . . <i>Ilkka Haukijärvi</i>	76
Accounting Professor Competencies: Identification of Educational Elements in the Education Process of Accounting Professors in Distance Education . . . . . <i>Maria Ivanice Vendruscolo and Patricia Alejandra Behar</i>	94

iPads in Education? A Participatory Design for Professional Learning with Mobile Technologies .....	106
<i>Keith Turvey</i>	

Breeding ICT Skills for the Industries: The South African Experience...	124
<i>Tiko Iyamu</i>	

## Key Competencies, Learning and Life Transitions

Life Transitions, Learning and Digital Technologies –Common Threads and Conceptions .....	139
<i>Don Passey</i>	

Digital Skills and Motivation in Young People in Transition .....	150
<i>Colin Rogers</i>	

Digital Skills and Competencies in Schools .....	165
<i>Sue Cranmer</i>	

Digital Skills for Employment .....	178
<i>Denise Leahy and Diana Wilson</i>	

Using “Yams” for Enterprise Knowledge Sharing among Knowledge Workers from the Perspective of a Task Categorisation-Knowledge Sharing Systems Fit .....	190
<i>Tong-Ming Lim and Angela Siew-Hoong Lee</i>	

An Exploratory Study on the Use of Knowledge Management System and the Employees’ Perception on Organisational Knowledge Sharing and Reuse .....	205
<i>Angela Siew-Hoong Lee and Tong-Ming Lim</i>	

Digital Skills for Those in Transition – Where Next .....	219
<i>Don Passey</i>	

## Key Competencies and School Management

Digital Storytelling and Key Skills: Problems and Opportunities .....	233
<i>Monica Banzato</i>	

Effect of Principals’ Technological Leadership on Teachers’ Attitude towards the Use of Educational Technologies .....	247
<i>Cevat Celep and Tijen Tülübaş</i>	

Creating Knowledge Sharing Culture via Social Network Sites at School: A Research Intended for Teachers .....	259
<i>Cevat Celep, Tuğba Konakh, and Nur Kuyumcu</i>	

The Effect on School Operations of the Use of School Management Software in Victoria .....	265
<i>Christopher Tatnall and Arthur Tatnall</i>	

An Information Service to Act in Binomial ‘Monitoring–Improvement’ of Educational Performance in Portugal: Three Focus Group Studies to Explore the Concept .....	278
<i>Antonio Castro and Delfina Soares</i>	

## **Educational Stakeholders and Key Competencies**

Key ICT Competencies within the European Higher Education Area ...	291
<i>Javier Osorio and Julia Nieves</i>	

Learner Differences in the Online Context: Introducing a New Method .....	306
<i>Arne Hendrik Schulz and Debora Jeske</i>	

Online Free School Meals as a Cloud-Based Solution: Three Case Studies of Its Use in England .....	318
<i>Alan Strickley</i>	

A National Single Indicator for Schools in England: Helping Parents Make Informed Decisions .....	331
<i>Alan Strickley, John Bertram, Dave Chapman, Michael Hart, Roy Hicks, Derek Kennedy, and Mark Phillips</i>	

<b>Author Index</b> .....	347
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