Preface

Since its beginnings the growth and development of the information systems and technology (IS&T) industry has been shaped, and limited, by the availability of sufficient numbers of skilled technical and professional workers. The main stakeholders include educators, students, industry executives, human resources professionals, and government officials and policymakers who are concerned with ensuring and improving the ongoing supply of IS&T professionals.

In addition to traditional concerns including student recruitment and induction; curriculum content and delivery; employment recruiting and career development; and the role of professional associations many tertiary IS&T programs throughout the world have experienced a dramatic decline in student numbers in recent years. The reasons for this decline in the face of growing demand are unclear.

Unfortunately, integration between and understanding among stakeholders is mostly topical and uneven. What articulation exists is mainly local in nature, generally involving a limited number of collaborating partners in a specific geographical area.

IS&T have become so critical to human enterprise and society that improving the integration of the stakeholders in the supply of new professionals, of understanding and "tightening" the human resources supply chain for the global industry, has become increasingly necessary in order to meet the needs of the industry in the decades ahead. This book is intended to help stakeholders to communicate and better articulate their efforts.

The purpose of this book is to provide a forum for illuminating and better understanding the dynamics of supply and demand for professionals in the IS&T industry. The objectives of the book include:

- Refining our understanding of the human resource supply chain for industry and research establishments
- Identification and discussion of issues of supply and demand of IS/T professionals from a number of stakeholder perspectives, including those of employers, students, recent graduates, and tertiary educators
- Helping stakeholders to understand these issues and learn how others perceive and deal with them

This book provides an international perspective from academic, industry, and government personalities in Asia, Europe, Ireland, the Middle East, New Zealand, the United Kingdom, and the United States.

In Chapter I, titled *A Dynamic Structural Model of Education and Skills Requirements for Careers in Information Systems: Perspectives Across Gender and Time,* Glenn R. Lowry, Rod L. Turner, and Julie Fisher present a directional model of the contribution and importance of education and skills required of IS professionals. The model provides a replicable and robust empirical approach for the quantitative interpretation of the relative importance of the respective variables from the perspectives of student and employer stakeholder groups toward the education and career development of IS professionals.

In Chapter II, *Leveraging Diversity in Information Systems and Technology Education in the Global Workplace,* Eileen M. Trauth and members of the Penn State University Center for the Information Society, including Haiyan Huang, Jeria L. Quesenberry, and Alison J. Morgan identity two human resource gaps that affect the preparation of tomorrow's IT workforce. These are a participation gap in which women and certain racial/ethnic groups are under represented in the IT workforce, and a knowledge gap in which students who do not develop cross-cultural awareness are not being adequately prepared for the global IT workplace of the 21st century. The authors argue that diversity is a lens that can be used to both understand human resource gaps and to develop curricular responses to them. The chapter presents a course titled "Human Diversity in the Global Information Economy" to exemplify a way of addressing the diversity dimension of the IT skill set.

In Chapter III, *Critique: I. S. Academics' Core Competency?*, Mike Metcalfe explores the proposition that the core competency of IS academics is a capacity for pragmatic critical thinking for developing unique and useful concepts to reflect on industry-related problems, rather than addressing specific technical problems and issues. Metcalfe discusses ways of critiquing problems, of seeing issues from differing perspectives, and argues that academics can usefully serve industry by developing and teaching new ways to critique management practice.

In Chapter IV, titled *Enterprise Systems Software in the Business Curriculum: Aligning Curriculum with Industry Requirements*, Ravi Seethamraju presents a review of literature on the inadequacies of business education, the pedagogical value of incorporating enterprise systems in the curriculum, and an analysis of the effectiveness of curriculum design and delivery. This chapter presents an analysis of the pedagogical value and effectiveness of an attempt at enhancing student learning about enterprise integration through IS&T. The author analyses the benefits, strategies, and challenges of incorporating industry–standard, enterprise system software solutions into business school curricula and reports on the effectiveness of some attempts.

In Chapter V, *Globalising Software Development in the Local Classroom,* Ita Richardson, Alan Malone, Sarah Moore, Valentine Casey, and Dolores Zage provide Irish and American academic and practitioner perspectives on preparing students to work in an environment in which the software industry has had to adapt to a global software development (GSD) strategy that has become increasingly popular as software development has become a globally sourced commodity. The authors provided students with an opportunity to take part in a learning experience that transcended geographical and institutional boundaries, giving them first hand experience of working within globally distributed software teams. They identified three specific forms of learning that took place: (1) pedagogical, (2) pragmatic, and the (3) achievement of specific globally distributed competencies. The chapter presents a discussion of how the projects were implemented and the educational research that was undertaken during the projects. Findings from the research are presented.

In Chapter VI, *Creating an Entrepreneurial Mindset: Getting the Process Right for Information and Communication Technology Students*, Briga Hynes and Ita Richardson emphasize the importance of entrepreneurship education in preparing students for professional information and communication technology (ICT) careers. The authors discuss how entrepreneurship education, through its broad and integrative philosophy, accommodates to changing workplace demands. This approach links together the synergy of enterprising activity and the small firm ICT sector through entrepreneurship education. This is achieved through the adoption of the process framework for ICT entrepreneurship education. Describing how to facilitate and encourage a more creative and enterprising mindset in ICT students, the authors present two courses that have been successfully implemented at the University of Limerick.

In Chapter VII, *Curriculum Change and Alignment with Industry: The Student Perspective*, Krassie Petrova and Gwyn Claxton focus on the need to understand the dimensions of the process of aligning ICT curriculum with industry requirements. This chapter presents the design and results of a study that focuses on students as stakeholders in the education process. A general framework based on a nomological net is introduced and used to derive the research models underpinning data gathering and the subsequent analysis of those data. The findings indicate that students realistically evaluate gaps in their learning but put more emphasis on technical skills, ignoring or undervaluing soft and business skills, despite academic efforts to develop these through skill-centered teaching. The authors also found a mismatch between student expectations of required skills and skills demanded by employers.

In Chapter VIII, *Aligning Learning with Industry Requirements,* Jocelyn Armarego is concerned that the underlying "socialization" necessary for new graduates to achieve "working professional" status is poorly addressed in formal education. After introducing a framework for comparison, this chapter presents an action research study in which nontraditional and innovative learning models are applied to address identified mismatches in alignment between formal IT education and industry requirements. The findings of the study suggest that models which focus on independent learning and soft skills prepare students to enter industry with enhanced ability to engage in the career-long professional learning required for success in professional practice.

In Chapter IX, *Relevance of Computing Programmes to Industry Needs in Jordan's Higher Education Institutes,* Ala M. Abu-Samaha reports on efforts in Jordan to better align industry requirements with academic curricula. The author aims to articulate the concerns and issues surrounding the relevance of computing programmes of higher education institutes in Jordan to market and employer needs. The chapter presents the findings of a study conducted in 2004 that identified many hard and soft skill gaps in existing curricula.

In Chapter X, *Professionalism and Ethics: Is Education the Bridge?* Zeenath Reza Khan, Ghassan al-Qaimari, and Stephen D. Samuel, writing from the United Arab Emirates, take up the topic of the role of ethics in the ICT profession. This chapter reports a study of the knowledge and views held by ICT professionals on ethical issues such as personal use of e-mail, net surfing, net privacy, and copyrights, recognized by professional societies such as ACM, IEEE, and ACS. Using a grounded survey approach, the authors investigated the relationship between unethical behavior in the workplace and knowledge and values gained through high school and university education. They investigated the extent to which unethical behavior is related to students' education and awareness of ethical issues. The authors suggest ways to include material that highlights ethical issues in the workplace.

In Chapter XI, *Experiential Group Learning for Developing Competencies in Usability Practice*, Phil Carter provides an industry perspective of software usability and reflects on his years of experience in a usability lab. Over the past several years, an approach to usability called situated co-inquiry has become a useful way to structure the teaching of software usability. This chapter introduces and illustrates how this experiential learning approach has been used effectively in a group setting.

In Chapter XII, *Industry-Academic Partnerships in Information Systems Education*, Mark Conway highlights several of the leading IT-focused, industry-academic programs such as Hyperion's Academic Alliance Program, the Teradata University Network, and SAP's University Alliance Program and references similar initiatives from Cisco, SUN, and IBM. As an industry practitioner, Conway offers insight into what motivates companies to sponsor industry-academic partnership programs, what the goals of those programs are, and how participating companies and universities benefit.

In Chapter XIII, *Industry-University Collaborations in Research for Information Systems: An Exploratory Study of a Management Model,* Tom O'Kane, writing from an industry perspective, has conducted

an exploratory study of a management model for industry-university collaborations in IS research projects. He proposes the extension of concepts found in commonly used software process standards for managing software projects to the management of IS project collaborations with universities.

In Chapter XIV, *Ethics for the Graduating Class: Issues, Needs, and Approaches*, Theresa M. Vitolo and Barry J. Brinkman identify and discuss some critical challenges of teaching ethics to students preparing for careers in technical professions. They argue that many of the issues and decisions facing technical professionals are not about technology but about the ethical application and ramifications of the technology in society. While historically, many higher education programs have focused primarily on specialized major discipline subjects, there is a growing emphasis by accreditation boards, professional organizations, employers, and society on the incorporation of ethical analysis into tertiary curricula. The authors discuss on-going challenges limiting efforts to include ethics in undergraduate degree programs and develop a composite of the ethical dimension of graduating college students in the IS&T field.

In Chapter XV, *Tomorrow's Workforce Today: What is Required by Information Systems Graduates to Work in a Collaborative Information Systems Workplace?*, Kathy Lynch and Julie Fisher report on a study in which they identified the needs of today's IS workforce in terms of the nondiscipline skills required to work effectively in collaborative teams. The chapter includes a list of collaborative skills, identified from the literature, extended and confirmed by key IT industry professionals. The authors identified two sets of skills: individual skills and group skills, that IS&T graduates must possess to work effectively in today's professional workplace. Their findings suggest that curriculum developers need to carefully consider how these skills can be taught and learned to properly equip our graduates for tomorrow's workforce.

In Chapter XVI, *COCA: Concept-Oriented Course Architecture: Towards a Methodology for Designing and Teaching Information System Courses*, Youcef Baghdadi introduces COCA as a new architectural approach to designing IS courses and curricula. COCA is a building-block approach for designing and teaching IS courses. Based on a flexible, scalable, well-specified architecture of IS concepts and their organization, COCA facilitates the complex and resource-consuming task of designing and teaching IS courses in an environment in which IS tools and concepts are rapidly evolving.

In Chapter XVII, *Enhancing the Employability of ICT Students with Hybrid Skills: Insights from a UK Survey with Small Business Managers*, Yanqing Duan, Daoliang Li, and Yongmei Bentley present an empirical study of UK small business managers' perceptions of the importance of hybrid skills to ICT staff in supporting business success. Their findings confirm the importance of hybrid skills from a small business managers' point of view and add further empirical evidence to support the call for a change in ICT staff training design and development in education and training organizations. A hybrid skills model is presented and significant implications of the findings are highlighted.

In Chapter XVIII, *Teaching Business Intelligence in Higher Education*, Paul Hawking and Robert Jovanovic write that, as enterprise resource planning (ERP) systems have become a necessary part of many business' IT infrastructures, supporting the day-to-day transactions of many of the world's leading companies, some universities have attempted to incorporate them into their curriculum offerings. In addition to such critical applications as customer relationship management (CRM) and supply chain management (SCM), leading ERP systems have evolved to incorporate more strategic components such as business intelligence applications. Universities and ERP vendors are investigating ways in which the IS curriculum can be developed to include these new solutions. This chapter discusses a blended approach adopted at one university in the development and implementation of business intelligence in the curriculum.

The authors of this book include practitioners and academics from Australia, Ireland, Jordan, New Zealand, Oman, the United Arab Emirates, the United Kingdom, and the United States. Together, they provide a global perspective of key issues of staff supply and demand facing IS academics and practitioners. These issues include the alignment of curriculum with industry requirements; soft skills formation and development by students; and lifelong learning by professionals. We are grateful to our authors for their contributions and are confident that their experience and insight will benefit the global IS profession in coming years.

Glenn R. Lowry, United Arab Emirates University, Al Ain, UAE
Rodney L. Turner, Victoria University, Melbourne, Australia
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