

Chapter 1

Introduction to the Broad Concepts Underlying this Book

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ABSTRACT

This introductory chapter presents general suggestions on the concept of quality-assured industry-oriented higher education in software engineering that relate to and underpin the other chapters in the book. The body of work reported here was based initially on the close co-operation since 2002 between Dublin Institute of Technology in Ireland and Harbin Institute of Technology in China, and on the subsequent development and propagation of this co-operation across Europe and China. The experiences described come from a range of countries, France, Spain, Germany, United Kingdom, Romania and Turkey, as well as China and Ireland. They capture many of the interesting and valuable lessons of these past eight years of thinking and research and development relating to international software industry-oriented higher education in the broad context of the global striving towards the knowledge economy. They make the case for a strong role for software industry-oriented higher education in the production of the software architects, developers, and engineers required for the future.

INTRODUCTION

There is a deep-going review and re-engineering of higher education, its roles and institutions, underway throughout the world. Technological and societal changes are buffeting the universities

and other higher education institutions, having revealed shortcomings in their services to the communities and societies in which they exist and on which they depend for their continued vitality (Beckman et al., 1997; Jaakkola et al., 2008; Kral & Zemlicka, 2008). Together with international and national agencies, the higher education institutions have been struggling to fully comprehend

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the forces of change and their implications and to forge new roles and identities as major shapers of the intellectual leadership of the changing society in every country (Dearing, 1997; OECD, 1995; World Bank, 2000).

A key force in driving these changes in society and in education is the rapidly developing computing and software industries, with their deep and often revolutionary working out in almost every aspect and corner of society. A knowledge economy and a knowledge society of unknown depth and extent are being forged across the world. Within this context, the development of the hardware systems and the practical and creative software required is dynamic in nature and the software industry itself, rather than the higher education institutions, plays the fundamental role in this process. The discipline of software development is thoroughly world-wide and the software industry is thoroughly globalized. For the optimum development of the software industry and of society into the future, higher education institutions need to produce graduates at primary and postgraduate degree levels that are well matched to the needs of local and international industry as well as being in tune with the needs of society in general. The central argument of this book is that in order to do so, these institutions need to be oriented to the software industry and engaged in a wide range of collaborations with the industry, involving their students and staff. This also requires a close and committed engagement by the software industry with the educational institutions. And there is need for the dynamic academic/industrial programmes to be fully quality assured through assessment and monitoring by external and international academic and industrial experts and peers.

In this regard, new and some old and neglected models of higher education with potentially improved matching to the needs of society are being developed, re-developed and evaluated.

The Dublin Institute of Technology Higher Education Model

The Dublin Institute of Technology (DIT) and its predecessor colleges have an historical legacy of over 120 years of higher education provision with an applied, technological, vocational, professional and industry-oriented emphasis mainly for young people in Ireland, but increasingly for those in other countries in Europe and beyond as well. In the past, this emphasis has prepared young people for technician and graduate employment in a wide range of scientific, engineering, service and business areas. DIT helped to serve as midwife in Dublin and Ireland for the revolutions in electricity, telecommunications and electronics, water and sewage, transport, construction, chemicals and pharmaceuticals, hospital laboratory and clinical technologies, retail and wholesale business and management and others since 1887. It has done so through producing skilled personnel for the workforce that introduced and maintained these emerging technologies by offering relevant and up-to-date industry-oriented education, training and research programmes (Duff et al., 2000).

DIT has strongly retained this industry-oriented approach to higher education in the current phase of industrial, social and economic development that has been fuelled by the information technology/communications revolution of the past thirty years (DIT, 2006, 2007). In now seeking to meet the challenges posed by the emerging knowledge economy, not only is DIT striving to continue to meet the immediate demands of its local community and economy, but is also continuing to broaden its perspective to meet the needs of Ireland as a player in the broader European Union (EU) and global community (Forfás, 2007). This challenge is formidable and is impacting upon all aspects of higher education policy and delivery. It requires that the higher education institutions absorb all the lessons of earlier successes to guide the re-engineering that is underway.

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