Chapter 9
Educating the 21st Century's Engineers and IT Professionals

Antonios Andreatos
Hellenic Air Force Academy, Greece

ABSTRACT

In this chapter, some important aspects of preparing engineers and IT professionals of the 21st century are examined, especially in the context of new media communication skills in trans-national and trans-cultural globalised environments. Initially, the chapter refers to the value and need of informal and continuing education; next, it reviews recent learning theories aiming at covering learning in today's complex, networked, and trans-cultural landscape; it also presents competences demanded in contemporary and emerging engineering and IT workplaces, as well as the skills needed by the 21st century's engineers and IT professionals. Finally, the chapter has proposed educational policies, enterprise policies, and suggestions for self-directed learning which will help preparing engineers and IT professionals for the workplace and will also enable them to continue learning, individually or in teams, both face to face and distance mode, and participating in real or in virtual communities of practice.

INTRODUCTION

This chapter is mainly for engineering and information technology (IT) students and teachers; it is also of interest to higher education institutions policy makers, responsible for the design or review of programmes, as well as, enterprise human resources departments. This chapter will be useful to working engineers and IT professionals who want to learn how they can profit from new media in order to remain competitive in today's highly antagonistic work environment. We look at things from the perspective of an individual, as well as, from the high level of decision-makers of organisations. The assertions are based on rich bibliography for further read-

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Table 1. e-Skills defined by the European e-Skills Forum (2004)

	Skill category / level	Description	Specialisation
1	ICT user	The capabilities required for effective use of ICT systems and devices by individuals in their everyday work. Use of common software tools as well as specialised tools supporting business functions within industries other than the ICT industry.	Engineers other than I(C)T
2	ICT practitioner	The capabilities required for researching, developing, designing, managing, producing, consulting, marketing, selling, integrating, installing, administrating, maintaining and supporting ICT systems.	IT engineers and IT professionals
3	e-Business	The capabilities needed to exploit opportunities provided by ICT (especially new media) to ensure more efficient and effective performance of organisations, to explore possibilities for new ways of conducting business and organisational processes, as well as, to establish new businesses.	Engineers and IT professionals

ing; case studies and examples have been used to clarify the discussion.

The chapter tries to elucidate the current landscape learning theories, the evolution of new media and how engineers and IT professionals can profit from new media in order not just to survive but also to succeed in the trans-national and trans-cultural globalised environment. Another goal is to show the need for continuing education, informal education and lifelong learning. Exactly for this reason it contains continuing education ideas and propositions. A wide range of case studies have been used to illustrate various issues related to the discussion.

New Media Literacy in the Digital Environment

Back in 1996, the 'New London Group' in a pioneer as well as visionary article, argued that today's world is characterised by an increasing cultural and linguistic diversity and a variety of new communication ways and channels, due to the evolution of ICT (Information and Communication technologies). According to the authors, traditional language-based pedagogical approaches do not provide adequate skills for working and living in general in today's multi-cultural societies, and that, a new approach to literacy pedagogy, which they have called 'multiliteracies', is needed instead. Multiliteracies is based on the assumption that the multiple linguistic and cultural differences in our society are essential to the working and private lives of students. The use of multiliteracies approaches to pedagogy will enable students to achieve the following two goals:

a. create access to the evolving language of work and community; and
b. foster the critical engagement necessary for them to design their social futures and succeed through satisfying employment (The New London Group, 1996).

In the new media era, the above words remain more relevant than ever. Towards this direction, the European Commission has founded the European e-Skills Forum. In 2004 the European e-Skills Forum defined and categorised the skills needed by engineers and IT professionals working in the European industry in three types (Fonstad & Lanvin, 2010, p. 4). Table 1 lists these three categories along with the related specialisation. Note: We shall treat the term ICT (Information and Communication Technologies) as roughly equivalent to the term IT (Information and Technology).

In 2010 the European Commission launched the "European e-Competences curricula development guidelines project." The authors of the report "Strengthening e-Skills for Innovation in Europe" define 'E-competences' as "e-skills with a strong emphasis on inter-personal and business skills"