Chapter 18
Impact of Technological Advancement on the Higher Education Curriculum and Program Development

Snezana Scepanovic
University "Mediterranean", Montenegro

Vania Guerra
Zürich University of Applied Sciences, Switzerland

Maren Lübcke
Zürich University of Applied Sciences, Switzerland

ABSTRACT

The current educational structure was created in response to the demands of an industrial society, which, alongside workers, needed an elite of highly educated professionals. The knowledge revolution accelerated this trend: professionals are now not only the people who "have" the knowledge, but they should be also able to find it quickly and efficiently, and have the skills to apply knowledge in new situations, extending the scope of their initial field of expertise. With massive growth of free open educational resources, knowledge became available and accessible to everyone with a simple Internet connection. All these conditions currently call into question the role and operationalization of educational processes in Higher Education, since universities are no longer the one central source of knowledge generation. In this chapter, the authors analyze the current situation in Higher Education, in terms of why a demand for transformation of educational models has been almost entirely unable to generate sustainable changes in curriculum development. Aside from theoretical foundations, the authors also analyze literature and what the practitioners have to say in that respect. The ultimate goal of this chapter is to set the basis for an analytical framework for discussions about the transformative process of Higher Education in order to be able to bring curriculum development a step forward, in a sustainable way.

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INTRODUCTION

Educational visionaries and reformers have long predicted a significant transformation of teaching and learning where technology would play a principal role. These visionary changes cover a spectrum that moves from cognitive approaches, such as customization of learning (e.g., Personal Learning Environments), to more socio-constructivist conceptions such as the latest challenges surrounding social learning and learning analytics. However, technological implementations in education have consistently fallen short of generating profound revolutions. Why have our most visionary dreams not been realized? Why hasn't technology dramatically transformed teaching and learning in Higher Education? The answer to these apparently simple questions is rooted in a complex combination of a variety of factors associated to the interplay between technological developments, scientific advancement and societal evolution.

The first strong impact of technology in higher education was at the time of the industrial revolution. Universities were changing their role from being scientific clusters towards being producers of highly qualified workers (professionalization and democratization of university studies), mainly specialists in the subjects' content, and hence the teacher's role was to be the expert in the subject. Professionals, including scientists and researchers, were expected to be 'experts' in their fields of expertise. When the advancement of Information and Communication Technologies (ICT) transformed industrial society into a networked and knowledge society (Castells, 2009), expert knowledge started to be at everyone's disposal. The demands from labor markets became more complex, since not only was expert knowledge needed, but also the development of social skills and autonomous learning, in order to cope with the new societal and workplace rules. The Bologna reform is a good example of changes in societal demands and those of the labor market (Leuven Communiqué, 2009). This is one of the biggest attempts to gather resources from all European higher education institutions, so as to cope with the complexity of educating professionals in a networked society and globalized market. One key point of this reform was the change from subject-centered curriculum toward a competences-based one. More than a superficial change, it turned to be a conceptual move from rooting formal education in behavioral and cognitivist learning theories, toward implementing socio-constructivist theories of learning as framework for understanding learning process and designing teaching practices. However, the appropriate implementation of socio-constructivist learning theories demands an adequate use of ICT and emerging technologies and devices. But most importantly: how do institutions cope with this demand, when their organizational and curriculum structures are rooted in the traditional behavioral understanding of learning? What shapes the understanding of teaching and educating? How is this competencies-based approach implemented? Which teaching competences are needed to successfully implement it? And what does faculty staff development look like in a competences-based era, settled in a subject or fields-centered institutional structure? These are questions that are still waiting for practical answers.

The transformation of teaching and learning in professional education nowadays certainly depends on the effective implementation of well-selected suitable technologies according to each educational situation. Although, innovation is the only clear learning outcome from the past 20 or 30 years of attempts to transform education by implementing different technologies. For achieving the dramatically different results that the educational community has longed for, innovators should change the rules, fundamentally altering the environment in which learning occurs. Particular technologies and technology standards are a key part of this process. However, no technology or standard has value in itself. Value comes from what is done through the implementation of those standards in the creation and use of effective and