

## Chapter 15

# Maturity Model for E–Learning Classroom, Bimodal and Virtual Courses in Higher Education: A Preliminary Study

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### **ABSTRACT**

*The use of information and communication technologies (ICT) in higher education, in many cases, does not necessarily correspond to an organizational, sustainable and consistent initiative in all courses or undergraduate programs imparted. An associated risk is wasting the potential of ICTs to contribute to the quality of education. This is an exploratory-descriptive, mixed methods investigation at Tecnológico de Costa Rica (TEC) to determine the components and factors affecting a Maturity Model (MM). Participants were students, teachers, and institution officials. Results show the components of a maturity model that provides teachers with a roadmap for implementing e-learning in face-to-face, bimodal and virtual courses, advocating for a substantial contribution to the quality of education at a Costa Rican University.*

### **INTRODUCTION**

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) expressed the mandatory nature of the universities to have a global perspective regarding quality, relevance, and innovation. Higher education institutions should incorporate Information and Communication Technologies (ICT) in their classrooms to fulfill these responsibilities adequately (Grajek, 2014; UNESCO, 2009). In this sense, virtual learning environments offer several advantages: they provide greater coverage, allow flex-

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ibility, expand academic offerings and enrich the educational experience, which must meet the established quality standards (Bichsel, 2013; UNESCO, 2009).

Higher education institutions require making ICT part of the everyday tools in the educational process. On the one hand, they must address the needs of students that expect, require, and essentially demand the use of digital technologies in their learning process.

On the other hand, we find the global society, represented by public and private organizations, prospective students, employers, accrediting agencies and government. They also exert pressure because they have a new system of employability standards, business development, personal, regional and international communication. Thus, the global society needs competent people in the management and implementation of digital tools required for a multicultural global society with virtual communication schemes (Área & Ribeiro, 2012; Bates & Sangrà, 2011; Ehlers & Schneckenberg, 2010; Gisbert & Esteve, 2011).

In the middle of these two forces, higher education institutions are looking for ways to help more teachers to master ICT and make them part of their daily practice (González, 2008): for this, training, incentives, and motivation strategies are offered. If higher education institutions do not evolve to meet the requirements of these two sectors, this could bring risks, such as loss of competitiveness and a rigid educational offer, among others.

Although there are several studies that point out the benefits of using ICT in universities (Cabero, 2006; Facundo, 2004; González, 2008; Grajek, 2014), their adoption by teachers does not necessarily correspond to an institutional, sustainable and consistent initiative in all courses or undergraduate programs they teach.

It is important to acknowledge that is not enough simply to include ICT in a strategic plan. A project of institutional nature is necessary to enlighten the way that teachers, institutions, and faculties must follow, that considers the processes involved, the indicators of maturity and quality as well as the timeframe for achieving each of the goals and actions.

An option to boost e-learning is to use a maturity model, which stems from the Capability Maturity Model (CMM), developed by the Carnegie-Mellon University to establish a model for evaluating processes within an organization of the software industry (Paulk, 1993).

Maturity Models (MM) work to transform the ability of the organization to identify active and continuously their priorities and quality standards, and enact systems to support continuous improvement (Marshall, 2012, p. 67). MM transcend checklists or hierarchies of “right” activities, and it is possible to adapt them to the educational environment (Mettler, 2010).

Cocón and Fernández (2011) developed a maturity model based on the proposals of the European Higher Education Area (EHEA) for the evaluation of online courses in undergraduate degrees within the EHEA. The specifications of this proposal include five levels of maturity. This model guides coordinators and directors with elements of effectiveness and efficiency to develop online courses. Predicted by maturity levels, the strategies are used in the organization to adapt harmoniously the subjects of Bachelor degrees online to the EHEA (p. 7).

In a different study, Neuhauser (2004) presented a maturity model for e-learning courses in higher education, which proposes a set of best practices to measure and improve student performance continuously, through multiple levels. To achieve this, the model describes the maturity levels, process’ key areas, and key practices to apply in the courses.

Meanwhile, Marshall & Mitchell (2002) raised the e-learning Maturity Model (eMM) to measure the maturity level of a higher education institution and to compare it with other similar bodies (benchmarking). This proposal has five dimensions: delivery, planning, definition, management, and optimization,

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