

# Chapter 8

## “E” is for “Ecology”: An Ecosystem Approach to Sustainable E-Learning

**M. Banu Gundogan**  
Middle East Technical University, Turkey

### ABSTRACT

*A promising e-learning system needs to be sustainable; resources should not be damaged or depleted and must continue to serve. Sustainability is not limited to the efficient use of resources; it defines how systems would remain diverse and productive over time. The ecosystem concept, a nature model for sustainability, has been associated with e-learning in recent years. Definitions and models have been presented; however, provisions for permanence and sustainability have not been studied specifically. This chapter presents the results of a study aiming to define sustainable e-learning ecosystems by emphasizing a “no waste” motto. Contributors from different disciplines were asked to define an e-learning ecosystem and analyze waste with reference to sustainability principles. Results denoted some wastes to be inevitable, but provisions with reference to green design methodologies were found to be assistive for e-learning developers to reach the best “no waste” solutions.*

### INTRODUCTION

This study aims to draw attention to the need of designing sustainable e-learning environments and proposes a road map within the framework of ecological principles and especially sustainability principles. E-learning environments are to be designed as unique systems in which participants with diverse backgrounds, various motivations, expectations and different teaching and learning

styles, either individually or within communities, interact. The major objective in designing these systems is to cultivate efficient learning experiences and every e-learning practice is unique regarding its content, participants, objectives and the environment in which it takes place. The ‘one size fits all’ vision has to be (and in some current applications, in fact, has been) left behind. Following developments in communication technologies, current research and applications reflect more effective methods, strategies and techniques to achieve functional results.

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21<sup>st</sup> century incentives in all fields of production have placed sustainability measures in their procedures as a necessity for meeting the needs of the present and future generations and being digital or virtual does not leave e-learning as an exception. Sustainability introduces provisions for keeping resources undamaged and renewable so that they continue to serve future generations. Like every design process, e-learning also has inputs, outputs and unfortunately, produces waste. Unless managed properly, waste is harmful and to avoid possible harms and to be able to respond both to current and future demands and expectations, ecological and sustainable perspectives have to be integrated into the e-learning design process.

Ecology provides a holistic view in the study of relations of living organisms with respect to each other and their natural environment. Natural ecosystems are particular areas in which all the living and nonliving components interact and a sustainable ecosystem is meant to flourish and support itself without outside influence or assistance. In ideal sustainable ecosystems, everything for the life to survive is already provided and no waste is generated. In recent years, various researchers have associated the concept of ecosystem with e-learning and have presented definitions and models for creating better learning environments. These definitions and models have been supportive in understanding the components, interactions, boundaries, uniqueness and diversity of e-learning ecosystems; however modeling provisions for its permanence and sustainability have not yet been sufficiently studied.

In the following sections, a literature review on e-learning ecosystems is given and the results of a study carried out at Anadolu University, Turkey, aiming to define sustainable e-learning ecosystems is presented. The study aims to define sustainable e-learning with reference to ecosystem definitions and analyze waste with reference to product life cycle analysis. The study preserves the fact that every e-learning practice is unique and proposes placing ‘no waste’ motto as an input to the design

process. The results of the study recommend program developers and designers a road map for designing sustainable e-learning ecosystems.

## **STUDIES ON E-LEARNING ECOSYSTEMS**

In recent years, various researchers have associated the concept of ecosystem with e-learning and have presented definitions and models for creating better learning environments (Zachry, 2000:434, McCalla, 2004: 1, Farzan and Brusilovsky, 2005: 4, Frielick, 2004: 328, Chang, 2007: 442, Pata, 2011:3, Reyna, 2011: 1083, Nasr, 2011:137). According to their approaches, these definitions and models can be grouped as:

- The *learning ecosystem* focusing on the necessity of up to date information and knowledge by underlining the fact that both information and learner/teacher needs change rapidly and by defining the ecosystem as a system which has to be able to keep up and respond to these changes,
- The *teaching ecosystem* focusing on the complicated interactions between learner-interface, learner-teacher, learner- content and learner-learner,
- The *digital ecosystem* focusing on the rapid development of information technologies which while providing extensive opportunities in reaching learning resources might also cause conflicts, and
- The *learning environment ecosystem* focusing on learning theories and models and defining the collaboration of facilitators, content developers, designers, institutions towards managerial strategies.

## **The Learning Ecosystem**

Koper (2001) states that the Internet has become the core medium for e-Learning, yet is not suffi-

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