

# Chapter 99

## Rethinking Education for Sustainability: A Mobile Learning Approach.

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### ABSTRACT

*This chapter presents a pedagogical model and a technological platform consisting of web and mobile technologies designed to support a mix of formal and informal, indoor and outdoor learning experiences. In particular, the platform is a reconfigurable system that can be adapted to support different kinds of learning formats. Two case studies will be presented to describe how the proposed pedagogical model and the technological platform can be adapted to address different contexts and learning objectives. The first case study – H2Flow – has been carried out in an high-school in Trento (north Italy) as an extension of the school curricula; the second one – Youth Mapping – has been deployed in underserved areas in Rio De Janeiro as part of a community-driven initiative led by UNICEF. In the conclusion, we discuss educational challenges and design opportunities concerning the use of mobile technologies in the context of education on sustainable development.*

### INTRODUCTION

Education for sustainability (ESD) is characterized by an interdisciplinary approach, with the unifying theme being a study of the relationship between society, economy and the environment. ESD should be built on value-based learning,

which promotes system thinking and emphasizes creativity, innovation, and our responsibility toward future generations.

In a recent paper, published in the Journal of Sustainability Education, Donald J. Burgess and Tracie Johannessen (2010) challenge the current ESD practices in many respects. By reviewing

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several studies, the authors highlight a trend: “we have watched sustainability education grow and define itself in contrast to place-based, nature-centered, experiential environmental education and see this as a detriment to the emerging discipline’s ability to accomplish its stated goals”. According to their perspective, ESD has been more focused on abstract and theoretical learning on economic and social issues, without building an underlying curricular foundation based around experiencing the natural world. They believe that to pursue ecosystem-based resource management, to understand functional ecosystem processes, or to gain an systemic understanding of sustainability requires “the cultivation of intimate knowledge of one’s home ground, of paying close attention to one’s surroundings and exploring one’s values and feelings based on the relationship of people to nature.” Ultimately, they argue that “to inspire people enough to make changes in their perceptions and behaviors, sustainability education must embrace the central role of acquiring ecological knowledge through direct and shared experience in the natural world”.

In attempting to achieve effective long-term behavioral and attitudes changes and to promote responsible choices, more traditional and formal education systems are lacking. This chapter focuses on experiential education in order to address the complex challenge of education for sustainable development. The authors intend to promote a vision in which the development of systemic and critical thinking, envisioning and creativity skills, and the ability of assessing personal values with respect to social and cultural context is grounded in place and project based, nature-centered learning activities.

In line with the situated cognition perspective (Brown, Colling, & Duguid, 1989), the authors believe that direct experiences in the natural and the social world are the basis from which the ability to consider broader connections and imagine alternative futures can unfold. From immersive learning experiences in natural settings, learners

can cultivate deeper understanding of sustainability issues by anchoring their own personal observations and values within a broader social, cultural and economical context.

By providing new means of interaction and participation, mobile and Web technology offer the opportunity to make new ways of learning possible. The use of integrated mobile and Web applications can offer exciting new possibilities to promote the changes in education methodologies called for in ESD.

Mobile devices enable ubiquitous access to information and media content while enabling the creation of new tools for learning and productivity. Devices themselves continue to evolve as their increased access to affordable and reliable networks makes them a user’s first choice for Internet access (Johnson, Smith, Willis, Levine, & Haywood, 2011). In addition, the number of mobile devices produced and purchased each year continues to grow, and newer devices and device formats continue to alter our notions of portability.

However, as the growing significance of mobile learning in higher education demonstrates (Traxler, 2007), the application of mobile devices to traditional practices within the formal educational system will not be sufficient to achieve educational objectives. It is of fundamental importance to develop relevant and innovative pedagogical practices and assessment methods for diverse, non-linear learning pathways by providing a mix of formal and informal learning opportunities. Such developments would lead towards the future of mobile learning. So far, the recent growth of the domain has been built on short-term, small-scale pilots and trials in the developed countries of Europe, North America, and the Pacific Rim. Mobile learning is considered relatively immature in terms of both its technologies and its pedagogies (Traxler, 2007).

According to Paas (2008), ICTs could play an important role in advancing ESD practices in two ways: by increasing access to educational materials about sustainability and by helping to promote

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