Chapter 17
Virtual Territorial Heritage in Education through mLearning Resources: Cities of Salamanca Spain and Santiago of Chile

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ABSTRACT

This research aims to establish the meanings and relations that exist between creating educational content for an application featuring Mobile Pedestrian Navigation Systems (MPNS) and Augmented Reality (AR), and the processes involved in Mobile Learning (mLearning). In this mobile context, the study aims to develop a training process linked to territorial information about the corresponding architectural and historical heritage of the cities of Salamanca (Spain) and Santiago (Chile), proving their educational importance. Methodologically, this research focuses on two main areas: (1) The optimized design of a learning platform with AR and MPNS resources in a historical context; and (2) the validation of the software's educational effectiveness in relation to other traditional teaching and learning tools. Finally, the study is in the process of creating a thematic heritage model determining the scope of this tool in the processes of mLearning, considering the elements of identity and local culture.

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INTRODUCTION

At present, important technological advances have occurred in the field of mobile devices (particularly tablets and smartphones) with the inclusion of highly specialized and complex, often expensive, sensors, and the ability to obtain relevant information that was not possible before it. This processing power and information gathering, has led to the widespread development of techniques such as Geolocation and Augmented Reality (AR), in the context of portable devices, enabling the development of applications and content for different areas, with different objectives and implementation structures.

Thus, certain fields, such as Education, have been greatly strengthened by the creation of new teaching and assessment instruments. They have also generated new paradigms and lines of action such as Mobile Learning (mLearning), where various fields of knowledge converge generating a clear unit of contents, methods, and objectives. In parallel, technologies such as Augmented Reality (AR) and Mobile Pedestrian Navigation Systems (MPNS) have been strengthened by the technological advances in portability that these devices provide, which, in turn, allow for the development of various contents on different topics with clear consequences for their educational implementation.

AR techniques have been under development for the past 25 years. They are composed of a mix of real and computer-virtualized information that combine the three spatial dimensions and creates a digital model complementary to the information present in the real world. Nowadays, this technology is strongly supplemented by the exponential increase in hardware capabilities in both stationary and mobile devices. It is mostly in the latter where important new features are being appreciated, which allows for a greater number of related AR activities content generation. This way the application of the aforementioned technology has been increased even more in various fields of knowledge, which include Education and Territorial Heritage subjects (Geography, History, Architecture, Archeology, among others) where important thematic content has been crafted, building new ways of presenting and broadcasting information about different places.

Almost all phenomena produced in the territory have been strongly influenced by the context suggested by technology, ranging from the simple representation or modeling of spatial scenarios, even the possibility of creating and structuring places from new and complex-structure data, with the development of processing techniques and methodologies of graphical display. From their beginnings as social beings, people have been involved with the land they lived on, creating various tools to understand these systems: from simple graph papers (maps) to the compass, from the astrolabe and systems of coordinates (latitude and longitude) to the current digital complexity of map servers implementation, global navigation satellite systems, and collaborative information found in the Web 2.0. Thus, it is now possible to highlight one of the fundamental dimensions of virtual data: location.

In simple terms, digital data have an important feature that corresponds to the spatial situation, which may initially reduce these phenomena to its euclidean context (expression in a system of coordinates known X, Y and Z), providing new perspectives on how to understand these elements from its spatial dimension and how they relate to each other in a territorial scenario, not only in a three-dimensional shape, but multidimensional, with features, relationships, and magnitudes that define the entire system.

Trying to represent multidimensional scenarios with the complexity of the territorial systems in a two-dimensional model system such as paper or screen is an elaborated process, which has many elements that must be considered in their synthesis, replication, and emulation. However, at present the technological scope, particularly, mobile devices, has enabled a revolution in the way that represent, consult, and access the spatial data.