

REMOTE AND MOBILE EXPERIMENTATION: PUSHING THE BOUNDARIES OF AN UBIQUITOUS LEARNING PLACE

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Abstract: Concepts like E-learning and M-learning are changing the traditional learning place. No longer restricted to well-defined physical places, education on Automation and other Engineering areas is entering the so-called ubiquitous learning place, where even the more practical knowledge (acquired at lab classes) is now moving into, due to emergent concepts such as Remote Experimentation or Mobile Experimentation. While Remote Experimentation is traditionally regarded as the remote access to real-world experiments through a simple web browser running on a PC connected to the Internet, Mobile Experimentation may be seen as the access to those same (or others) experiments, through mobile devices, used in M-learning contexts. These two distinct client types (PCs versus mobile devices) pose specific requirements for the remote lab infrastructure, namely the ability to tune the experiment interface according to the characteristics (e.g. display size) of the accessing device. This paper addresses those requirements, namely by proposing a new architecture for the remote lab infrastructure able to accommodate both Remote and Mobile Experimentation scenarios.

Keywords: Mobile Experimentation, mobile devices, M-learning

1. INTRODUCTION

The permanent technological evolution has been changing habits and attitudes. Technology has become a major change factor of global economics, allowing an easy exchange of information among different places and countries. The increasing pace at which information circulates has been improving people's lives, giving them flexibility to access knowledge. However, and at the same time, it promotes new changes, imposing more requirements for people to meet the demand of information and culture, in order to avoid being out of up-to-date knowledge.

While in the early transistor days (20th century) the radio, in the 20's, and the TV, at the end of the 50's, gave access to information, later, during the 60's, computers appeared. These started to be machines to process data in situations where man work was hard and difficult, namely in repeated tasks like calculations. Later on, in the 80's, the appearance of Personal Computers (PCs) with enhanced features, namely the possibility to display images, video, interactive contents, and others, triggered the feeling in the educational community that these devices

could change the learning/teaching process. These facts are depicted in fig. 1 that illustrates the technological evolution until the appearance of PCs.

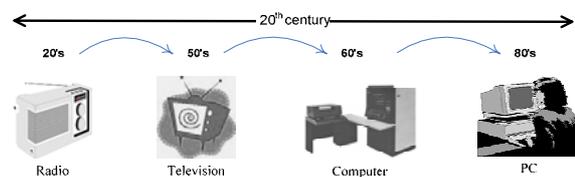


Figure 1: Technology evolution: from radios to PCs

As time went by, the Data Processing Era (1960 to 1980) gave place to the MicroComputer Era, (1980 until 1990), where PCs took an important role in many sectors of our society. It was during this last era, in the mid 80's, that PC features were seen as a benefit to education, namely as a complementary resource to improve the quality of the teaching/learning process. A new concept named Computer Based Learning (CBL) and defined as the local access to educational resources like demonstrations, video and audio, graphics and others, through a PC (Wikipedia 2005), emerged.