

Chapter XIV

Enhancing Individuals' Cognition, Intelligence and Sharing Digital/Web-Based Knowledge Using Virtual Reality and Information Visualization Techniques and Tools within K–12 Education and its Impact on Democratizing the Society

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ABSTRACT

This chapter addresses an ongoing work strategy for developing and sharing knowledge related to digital/Web-based technology and multimedia tools, information visualization, computer graphics, desktop

virtual reality techniques in combination with art/education. It includes a large body of research about advanced and contemporary technologies and their use for stimulating individuals' education. These interactive processes of researching, developing and sharing knowledge have been carried out through interdisciplinary and collaborative learning and teaching experiences in the context of k-12 education in a primary public school and its surrounding community. The learning and direct manipulation of advanced and contemporary technologies have improved individuals' technical skills, stimulated cooperative and collaborative work and innovations in the way of developing school's curriculum content as well as supported ones' independent learning. Furthermore, there have been changes on individuals' mental models, behavior and cultural changes related to reflecting about diverse possibilities of using information and communication technology within collaborative formal and informal sustainable life-long learning and teaching actions.

INTRODUCTION

This chapter addresses an ongoing educational experience of sharing digital/web-based knowledge (Franco & Lopes, 2005b; Franco, Stori, Lopes & Franco, 2005) related to disseminate and use a combination of contemporary and advanced technologies (Barbosa, 2006), culture, science and arts in the context of a primary education school for supporting individuals' collaborative, interdisciplinary, dynamic, interactive, sustainable, high quality and lifelong learning (Burdea & Coiffet, 2003; Cunningham, 2008; Estação Ciência, 2009; Franco, 2000; Franco, 2001; Franco, Ficheman, Assis, Zuffo, Lopes, Moreno & Freitas, 2008; Grasset, Woods & Billinghamurst, 2007; IINN-ELS, 2009; Kaufmann & Meyer, 2008; Projeto Clicar, 2009; Sherman & Craig, 2003; Tan, Lewis, Avis & Withers, 2008).

The educational experience has been developed through using a wide variety of technologies such as web-based technology, desktop virtual reality -VR, information visualization and computer graphics techniques, and low cost multimedia tools and files, which in this text, we call contemporary and advanced technologies. The contemporary technologies have been applied in the context of a public primary municipal school that is situated in the Parada de Taipas neighborhood, in the suburb of the city of Sao Paulo. Many students that live

on this area are from low-income families, are under socio-economic disadvantage and at risk situation (Franco, Cruz & Lopes, 2006; Projeto Clicar, 2009; Estação Ciência, 2009).

On the other hand, within the goal of contributing to improve this uncomfortable social situation, through learning and using information and communication technology in combination with other multimedia, advanced and contemporary technologies for stimulating individuals' education, students and educators have developed technical skills, as well as engaged in cooperative and collaborative and independent learning attitudes (Franco, Ficheman, Venâncio, Moreno, Freitas, Leite, Franco, Matias & Lopes, 2008c; Franco & Lopes, 2008).

According to Singer (2002) individuals' will and attitudes to learn and experiment are key points for developing a solidarity economy able to support under socio economic communities improvements. Furthermore, the learning situations and activities based on contemporary and advanced technologies have encouraged a community that by its own initiative has improved its life condition, renewed its cultural tradition and rebuilt individuals' human dignity.

We believe and our observations related to individuals' learning attitudes when they are dealing with the learning situations proposed for problem solving have highlighted that using contemporary

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