

Advances in Intelligent Systems and Computing 478

Mauro Caporuscio  
Fernando De la Prieta  
Tania Di Mascio  
Rosella Gennari  
Javier Gutiérrez Rodríguez  
Pierpaolo Vittorini *Editors*

# Methodologies and Intelligent Systems for Technology Enhanced Learning

6th International Conference

 Springer



# A Study on Teaching and Learning the von Neumann Machine in a 3D Learning Environment

Maria Rosita Cecilia and Giovanni De Gasperis

**Abstract** The paper presents the design of three serious games for teaching the basis of the von Neumann's machine in a 3D environment. For this objective, the paper initially defines a framework useful to describe the design, then uses the framework to introduce the games. Furthermore, it presents a first prototype of one of the described games. It then describes the protocol that will be used to evaluate the usability, proficiency and psychological effectiveness of such games, and ends with a brief discussion on the proposed study.

**Keywords** Virtual learning environment · Technology enhanced learning · Computer architecture

## 1 Introduction

Technology-enhanced learning is not a new concept. The use of technology to strengthen the student learning experience is a well established area of interest across all tiers of global education. Educators have always tried to integrate technology into the instruction process. However, innovations in content delivery, assessment methods, and adaptive learning have changed the way in which both teachers educate students and how students learn.

One of the innovations introduced in the TEL field has been the adoption of 3D technologies, as for enabling users to navigate, perform activities, and communicate among themselves at the same time, in a virtual space [1]. Another one has been

---

M.R. Cecilia

Department of Life, Health and Environmental Sciences, University of L'Aquila, L'Aquila, Italy  
e-mail: mariarosita.cecilia@univaq.it

G. De Gasperis (✉)

Department of Information Engineering and Computer Science and Mathematics,  
University of L'Aquila, L'Aquila, Italy  
e-mail: giovanni.degasperis@univaq.it

© Springer International Publishing Switzerland 2016

M. Caporuscio et al. (eds.), *mis4TEL*,

Advances in Intelligent Systems and Computing 478,

DOI: 10.1007/978-3-319-40165-2\_10