Chapter 15
Serious Gaming at School:
Reflections on Students' Performance, Engagement and Motivation

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ABSTRACT

The concept of Serious Gaming refers to the adoption of classical entertainment games for purposes other than entertainment, including learning and instruction. In this paper the authors report on a Serious Gaming field experiment where typical board games (such as battleship, master mind and domino) were employed with the shifted purpose of triggering and sustaining primary school students' reasoning and logical abilities. The results of the field experiment showed that: 1) there is a strong correlation between school achievement and the ability to play and solve this kind of games and that 2) motivation and engagement in game-based learning tasks is very high, irrespective of the level of achievement of the subjects. Final considerations are drawn about the potential and the opportunity of adopting the considered games to support those reasoning skills that are widely recognized as transversal to any kind of learning and thus deeply affecting overall school performance.

INTRODUCTION

This paper presents the results of a research study in the field of game-based learning. More precisely, it refers to an experiment conducted in primary schools where digital versions of traditional board games were employed with the aim of sustaining the students' logical and reasoning abilities.

The games adopted during the experiment deeply require the enactment of thinking skills. They can be considered "cognitively responsible" (Martinovic et al., 2013) and are usually referred to as mind games (Bottino et al., 2009), brainteasers

or puzzles (Kebritchi et al., 2010; Milovanović et al., 2009).

If we follow the classification proposed by Djaouti, Alvarez and Jessel (2011) we can set the reported experience in the area of Serious Gaming.

According to these authors, in fact, Serious Gaming is a label that refers to the use of "any video game for serious purposes, whether the serious dimension is or is not designed within the software" while "Serious Games is a label that refers to applications featuring both a serious and a game dimension within the software."

Actually, the games adopted, were not Serious Games in that they had not been originally designed having in mind an instructional (serious) purpose but rather for entertainment (Kirriemuir & McFarlane, 2004). Nevertheless, they were used by the authors in a school context by shifting their original purpose to serve a serious, instructional purpose and this was done without operating software modifications, in a genuine Serious Gaming perspective.

This paper, based on concrete data from the above mentioned experiment, explores the links between the possession of the reasoning abilities involved in the use of a set of digital mind games (Rohde & Thompson, 2007; Bottino et al., 2008) and school achievement.

To date, few scientific studies report experimental data confirming the possible link between school achievement and the ability to solve mind games, despite the fact that research studies in the field have evidenced that the use of digital games can:

- Offer a variety of educational benefits (Sandford et al., 2006; Prensky, 2001; Hong et al., 2009; De Freitas & Oliver, 2006; Pivec, 2007);
- Promote the development of cognitive and complex problem solving skills (Felicia, 2009a);

- Contribute to the enhancement of school performance (Robertson & Miller, 2009; Franco et al., 2011).

The research study this paper refers to confirms such results and shows that there is a strong correlation between school achievement and the ability to play and solve digital mind games and that, however, motivation and engagement in game-based learning tasks is very high, irrespective of the level of achievement of the students involved. In the following, the context of the study is briefly presented together with the tools adopted; subsequently, the methodology of the experiment is detailed and the main results are presented as to students' performance; further reflections are proposed regarding some affective aspects of the experiment including students' engagement and motivation. This allows drawing some final considerations on the potential of mind games to support young children's reasoning and logical abilities.

SETTING THE SCENE

In the following, before presenting the methodology underpinning our study and its key results, we briefly summarize some basic aspects of the experiment including the description of the target population involved and of the tools adopted.

Target Population

The experiment was conducted in twenty Italian primary schools classes in the Lombardia region: it involved 60 children in 4th and 5th grades. A further group of 20 students with certified cognitive impairment (and consequent deep, generalized learning difficulties) from a school in Genoa was also considered. This was done with the specific objective of further verifying the games suitability

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