

# Chapter 4

## Digital Games: Learning Spaces for Executive Functions Stimulation

Lynn Rosalina Gama Alves  
Federal University of Bahia, Brazil

### ABSTRACT

*The chapter aims at socializing the results of the investigation that the Gamebook Guardiões da Floresta (Gamebook Guardians of the Forest) had as an interactive, ludic, and mediator environment for stimulation of executive functions for children 8-12 years of age. The research was of a qualitative nature, characterized as a collaborative process of development and research on children, in the Municipal School Roberto Santos, Salvador, Bahia, having participant observation and sensitive listening as investigative devices. The results point to the necessity of giving feedback to the environment and also the continuity through this second part with neuropsychological evaluation before and after the interaction with the Gamebook in order to strengthen the evidences for this media contribution as a learning environment.*

### INTRODUCTION

Digital games are part of the universe of children and teenagers who live immersed in mediatic narratives and also in transmedia storytelling, thus creating spaces for fruition and entertainment. These interactive environments can promote a collateral learning that might dialog with the school syllabus. Collateral learning is a concept presented by Dewey and adopted by Johnson (2005) referring to learning caused by digital games which mobilize the players to go beyond the game universe.

Collateral learning is not related to content. Instead, it is related to concepts which are developed by interaction with games and that might be used or not in different school situations. For example, by interacting with the game called “God of war”, the player might be motivated to know more about Greek mythology and to search for information outside the game universe, through literature, discussion forums, videos in order to widen their background on the theme and to improve their experience in the game. Another example would be widening their background on soil types while creating universes in the open world of “Minecraft”. That kind of learning can be stimulated with a diversity of games which has brought interest to entertainment.

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Thus, digital games can constitute an interesting locus for teachers and students, bringing them closer to each other and allowing a more ludic and interactive way in which students and teachers become protagonists of both processes of teaching and learning.

Commercial games draw the players' attention far more due to the quality of their graphics and images. Although their mechanics still adopts classical models many times, such as platform games, they favor more engagement and experience for the player. Challenges, systems of rules, feedback and reward are better structured, enabling the player to see the process clearly. However, Brazil is currently presenting a trend of developing games aimed at scholar learning scenarios. It is the case of Joy Street<sup>1</sup> (Pernambuco), Redalgo (São Paulo), Centro de Pesquisa e Desenvolvimento Comunidades Virtuais – CV (Virtual Communities Research and Development Center – UNEB - Bahia), among others. In the report financed by BNDES (National Bank for Economic and Social Development) and performed by GEDIGAMES/USP (Group of Studies and Development of the Games Industry - 2014) on the mapping of Brazilian Gaming Industry, it was showed that digital games production for educational scenarios (621 games) presented numbers very close to those of games developed solely for entertainment (698 games).

Both commercial games and games aimed at educational scenarios may constitute themselves into environments for stimulation of the executive function (EF) which is fundamental for the cognitive development of children, especially those who are at elementary school. It is the case of “As aventuras do ouriço”, “Pedro no acampamento”, “BIGAME”, “O jogo do supermercado”<sup>2</sup>, among others. EFs allow us to organize the world around us, taking into account the experiences, information and knowledge which are stored in our memory (Cosenza and Guerra, 2011).

For Diamond et al. (2007), working memory functions, inhibitory control and cognitive flexibility constitute themselves at the *core*, expression used to refer to basal functions for the EFs. The importance of these functions may be understood by the metaphor that these ones act as the conductor of the orchestra which is the cognitive system.

Diamond et al. (2007) carried out a research with 147 children at their 5 years of age in which they defend the possibility of teaching abilities related to executive functions in school, considering that precocious stimulation can bring benefits in the medium to the long term, including by diminishing the costs generated by the diagnosis of disorders related to these functions, such as ADHD (Attention Deficit Hyperactivity Disorder) and conduct disorder.

Within that context, the chapter proposed here aims at discussing and analyzing the potential of the Gamebook – Guardiões da Floresta<sup>3</sup> - GBF (Gamebook Guardians of the Forest), a game developed for school and clinic scenarios, for the stimulation of the executive functions of children from 8 to 12 years of age. The referred media is available and free of charge for tablets with Android operational system and in three different languages (Portuguese, English and Spanish).

With that purpose, the chapter will be divided into three sections and a conclusion approaching digital educational games and their integration with executive functions and the serious digital games in education.

The Intention is proposing a critical analysis pointing out the limits and possibilities in the mediation of digital games, especially in school scenarios.

In the first section, the introduction of the chapter will be presented contextualizing the problematics of the interface digital games and school scenarios pointing out the difficulties of that interaction, considering the data from research carried out by Research Game Brazil 2017, done by th Sioux Blend and ESPM, which evidence children and teenagers access to digital games.

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