

Towards a Collaborative Educational Game Model

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INTRODUCTION

In a collaborative learning process, concept learning may happen simultaneously with the practice of sociable attitudes and essential values, motivating the learner in the knowledge acquisition process. Among the tools that are likely to help reinforcing the learner motivation, both in and out of classroom settings, are computer games, especially the ones played interactively by two or more players, known as collaborative games,

A collaborative game used as an educational tool in classroom settings or at a distance, integrated to appropriate pedagogic practices, is a collaborative educational game. Aspects as ludic engagement, competitiveness and interactivity inherent to collaborative educational games may deepen children and youngsters' motivation to learn, helping to make the learning process more effective (Prensky, 2001).

This paper presents an e-collaborative educational variation of the widespread computer game Tetris¹,

called e-Collaborative Educational Game Tetris or Collaborative JETetris for short, its underlying model and prototype. Simulations done with the JETetris prototype helped to derive a proposal to a Web-based collaborative educational game model—CEG Model, which allows the creation and use of many kinds of games, instead of just JETetris.

In the next section, the background on the use of games in education is presented. Next, Collaborative JETetris, its prototype and the draft of a collaborative educational game model are depicted. Finally, some conclusions and futures perspectives of this work are drawn.

BACKGROUND

In the education setting the applicability of games has been the focus of recent studies. However, the use of games as a tool to assist the teaching of specific

contents in the classroom is not a new idea (Hill, Ray, Blair, & Carver, 2003). In the 1970s, for instance, the importance of games in the educational process was discussed along with the use of computers in basic education (Poirot, 1976).

Anderson and Holt (1996) mention the use of games in classroom in the study of instructional contents of social sciences and economics. Almstrum, Ginat, Hazzan, and Morley (2002) encountered the use of games in the teaching of mathematics, and Herr (2002) cites their use to support the teaching of sciences. Navarro and Hoek (2004) present an educational game for teaching the software engineering process, where the learner can assume the role of a project manager of a development team.

The playful characteristics and challenges of games make learners feel attracted and motivated. Coleman, Krembs, Laboureur, and Weir (2005) pointed out that learners have their initial experience with computer games way before they get to know the Internet. They also discuss the need for research related to the design of games, proposing the implementation of courses that include studies on the most diverse contents related to games, including educational games.

Many instructional principles can be related to the process of learning games. Out of them, the following are worth mentioning: *active learning* (Bonwell & Eison, 1991; McKinney 2007), *peer or collaborative learning* (Tinto, Goodsell, & Russo, 1993; Wills & Finkel, 1994), *problem-based learning* (Savery & Duffy, 1995) and *game-based learning* (Haas, 1988; Feezel, 1993; Prensky, 2001).

In a collaborative learning context, besides the amusing aspects involved in the educational process, the use of games promotes social interaction encouraging the exchange of knowledge between learners in the group, as well as stimulating their reasoning skills (Elgood, 1990). Playing games allow learners to practice, in classroom settings or at a distance, inestimable values and attitudes that help living in society (Prensky, 2001).

Vartiainen and Ruhomaki (1995) reported their findings about some positive effects of games on groups of participants in the process of collaborative learning, for instance, improvement in communication and cooperation, development of social skills and changes in classroom relationships such as increase of empathy, exchange of information and ability for conflicts solving.

According to Galvão, Martins, and Gomes (2000), collaborative learning through simulation games can promote the development of a number of skills in the learners that facilitates the decision-making and problem solving process as well as their social interaction in different groups.

There are currently a few research works focusing on the potential of games in the process of collaborative learning in the classroom (Galvão et al., 2000). Therefore, the importance of learning and games' model involving such actors as teacher, learner, game and instructional model is subject of reflections in the current literature (Garris, Ahlers, & Driskell, 2002; Jenkins, Klopfer, Squire, & Tan, 2003; Soh, 2004; Teixeira et al., 2005).

COLLABORATIVE JETETRIS

Tetris game (Wikipedia, 2005), besides being an excellent resource for individual amusement, helps the players to evolve both their geometric reasoning and motor coordination skills. Collaborative JETetris is based on Tetris game, allowing the competition between two players in a local area network or through the Internet. In addition, unlike individual Tetris, Collaborative JETetris is to be used in classroom settings or at a distance, allowing the learner to act in a competitive way during the game and in a collaborative way before and after the game, during the definition of specific rules of the game and in the resolution and discussion of questions for enhancing concept learning.

The interactions during a game session always take place in pairs of learners chosen by the teacher. One pair plays against another, where learners of a pair are named "allies" and learners of the other pair are named "opponents."

Although JETetris is also suited for groups of older learners, this project is intended to children and youngsters (6 to 14 years old) of the basic education.

Figure 1 illustrates the flow of learner's actions during a JETetris game session. The teacher's actions, in consonance with the adopted instructional model, allow defining a set of rules that may delimit the scope of the learners' performance. This can avoid contents overloading which the learner might not be prepared for. This can also facilitate the teacher task for defining learning activities intended to work out cognitive and social aspects in classroom settings or at a distance.

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