Chapter 14
A Perspective on Games and Patterns

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ABSTRACT

In the last few years, the authors have been carrying out a study involving elementary school students from 3rd to 6th years of schooling. The main goal of this study is to identify the possible relationships between the ability to identify patterns and the ability to play games, in particular mathematical games. The research methodology is quantitative and most of the analysis is concerned with the verification of correlation between variables. The analysis takes into account seven factors (besides the ability of pattern recognition) identified through a factor analysis carried out on data. With these tools, the authors have been able to differentiate games according to the different measurements. In this chapter, they disclose the important steps of this research as well as the results and main conclusions reached so far.

INTRODUCTION

Playing games is part of human culture and, according to Huizinga (2003), play is even older than culture. Actually, over the centuries, children and adults of different civilizations have occupied some part of their leisure time playing games, as we can see in a wide variety of archaeological artifacts, such as board games marked on stone

floors of Roman remains, some paintings, and on the beautiful book of games by Alfonso X. Nevertheless, so far it is impossible to establish where and when games started to be used, since some games require no specific material to be played. Fortunately, some of these games, namely board games, are played with pieces made in stone or wood that resisted over the years and now are preserved in museums. These artifacts prove that board games have been played for more than 4 000 years (Murray, 1952) (see Figure 1).

Figure 1. The royal game of Ur, from Ur, Southern Iraq, about 2600-2400 BC (British Museum)

Nowadays, the interest in games remains. However, beyond the recreational aspect of games, the educational community has also become interested in possible pedagogical uses for them. The benefits of ludic environments, namely its motivating characteristics, may be used to promote the development of math skills, as is pointed by some guidelines of the Portuguese curriculum until 2011.

The word 'game' is used to describe different kinds of activities, such as children games, sport games, video games, guessing games, board games, among others. Consequently, it is essential to clarify the type of game that we are talking about. Although our interest rests on games in general, presently we are more focused on strategy games, known as mathematical games or abstract games (Neto & Silva, 2004). These particular games do not involve chance or hidden information. There is a large diversity of mathematical games, some well known, as chess, go and draughts. This kind of board games has been used in educational research and chess was perhaps the game that raised more studies in order to verify whether its practice improved math skills in their practitioners (Filguth, 2007).

In addition to games, another aspect that interests us in mathematics education is pattern identification. In fact, the ability to identify pat-terns is related to diverse areas of mathematics and some authors consider mathematics as the science of patterns (Devlin, 1997; Steen, 1990). This new concept of mathematics is very important and, the Portuguese curriculum of mathematic for elementary education, points to the development of the ability to identify and explore patterns in mathematical and non-mathematical contexts (DGIDC, 2007). Nowadays, mathematics educators should provide students the opportunity to visualize mathematical patterns to develop their mathematical power. In elementary mathematics education, teachers must be even more concerned about the improvement of the ability to find patterns in their students. According to Steen, "to grow mathematically, children must be exposed to a rich variety of patterns appropriate to their own lives through which they can see variety, regularity, and interconnections" (Steen, 1990, p. 8).

In this chapter we are going to focus on Chess, Wari, Traffic Lights, Dots and Boxes, Cats and Dogs, Dominoes, and Syzygies (a word game invented by Lewis Carroll), among other games. We will present the major steps and principal results of a study which main goal is to identify the relationships between the ability to play each one of these games and the ability to identify patterns in elementary school students.

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