

A Game Editor for Virtual-Prismaker Learning Environment to Improve Teaching and Learning in Classroom

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Abstract: This paper describes a personal game editor developed to improve teaching and learning strategies in classroom through a learning environment called Virtual-Prismaker. Most educational games are closed in the sense that the teacher is not permitted to introduce new activities. In the context of Virtual-Prismaker project we have faced the need to open the game's educational possibilities by enabling to incorporate the educator's experiences and needs, and by enforcing the motivation children find in playing computer games.

1. Introduction

When preparing activities that are to be carried out in classroom, the teacher tries to maximize the use of available resources. Prismaker is a construction game composed of reduced number of kinds of available pieces. The main construction block is a semicube. Apart from these basic construction blocks, there are a series of additional pieces: wheels, axis, small cylinders and logos. In our context, logos are very useful and greatly improve the construction game's cognitive capacities. Indeed, logos are used to assign blocks a meaning. Teachers are able to create a greater number of different games for distinct school matters by using this highly interesting feature. Information technologies provide new tools for the creation of contents that adapt to children characteristics, to their learning capacities and to their special needs. Our research team is involved in the development of an interactive learning environment based on the physical educational game Prismakertm [Prismaker, 2001]. The game is called Virtual-Prismaker [Gonzalez et al., 2001; Lopez et al., 2001]. Introducing new technologies in classroom does not mean substituting the teacher's work. It rather allows creating new games according to the students needs. This is the cue we are approaching in this paper.

2. A Game Editor to Improve Teaching and Learning Strategies

Computer games designed for education in classroom should allow the teacher to create and to modify the existent playing possibilities to adapt the material to the learning necessities of the different students. Thus, the central idea of our project is to offer the possibility to personalize games. Observing similar games that exist in the marketplace, we have noticed that their playing possibilities are totally closed. Our solution is to offer teachers an open game. For the currently available types of games, the teacher is in charge of creating those activities he considers to be convenient, as well as their characteristics. Here is where the teacher's educational role begins. Our virtual game editor tool is not sought to substitute the teacher's labor, but to offer him to be a decisive part in a new teaching means.

A characteristic incorporated to the game is the division in difficulty levels. This also bears a motivation aspect for the player as he is challenged to complete all the levels. The difficulty levels are based on the age of the player and the teaching matters (mathematics, history, language, etc). The student has to overcome, according to his age, the different difficulty levels to complete each matter. It is the teacher's job to associate any playing activity to a certain level.

In our solution the main raw material needed to create activities are images. We have also created a letter/word editor that allows us to create simple images containing letters, numbers and words in a quick and easy way.

3. The Game Editor Capacities

3.1. Meaning related games

These kinds of games have been incorporated as they throw two desirable characteristics for learning. The first characteristic is its memory training capacity. And, respect to the concept of association, it offers a great potential applied to any matter. Some examples are offered now. In a Foreign Language course it is possible to give the native word and the foreign word for it. An example in Geography is to show the name (or the map) of a state and the name (or a representative monument) of its capital. There is no limitation to the teacher's imagination. Thus, it is feasible to create identical couples, to create couples with the same concept or even to create couples with some preset relationship. This way, children learn to relate concepts. The association possibilities are infinite. For example we can enumerate the following ones: learning words in several languages, relating two numbers associated somehow, comparing an image to a written expression, associating the same images.

3.2. Order related games

This second kind of games is based on composing an original image where the important thing is the order of the parts that compose the global image. The student is given the original image and the disordered pieces. Considering the fact that the important thing is the order, we have added to this type of game the possibility to create a sequence of images. We can create this way, for example, an alphabet, a sequence of images that describe a story, etc. Another possibility is to create a sequence of images where the order is the important thing. The editor offers a multiple image viewer for this case. Once we have the images, the creation of an activity game of this type is very simple. We can create image sequences such as an alphabet, a story where each drawing represents a part to the story, etc. Series or patterns are allowed too. When a pattern is being created the teacher decides the elements the pattern will consist of, along with the number of times the pattern must be repeated. A mathematical sequence could be created defining the initial value, the expression to calculate the next element and the minimum number of elements to play successfully that game.

3.3. Meaning plus order related games

Meaning plus order has been used in a game based on mathematics, so that children are engaged to learn about the basic operators in a simple way. In this kind of game, the student is offered a disordered mathematical expression, where each piece contains an image of an operand or an operator. The student's mission is to place the pieces so that the expression is correct. Therefore, both the order of the pieces and the result calculated to evaluate the expression has to be correct. Each piece will be an integer number or one of the following operators: sum, subtraction, division, multiplication, right parenthesis or left parenthesis.

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