Digital Game Fostering Spatial Abilities for Children with Special Needs

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Abstract : As visual and spatial awareness develops, children apprehension of the concept of direction, (relative) distance and (relative) location materializes. Here we present the educational inclusive digital game ORIESPA, under development by the Thematic Line Geometrix, for children aged between 6 and 10 years old, aiming the improvement of their visual and spatial awareness. Visual-spatial abilities are of crucial importance to succeed in many everyday life tasks. Unavoidable in the technological age we are living in, they are essential in many fields of study as, for instance, mathematics.The game, set on a 2D/3D environment, focusses in tasks/challenges on the following categories (1) static orientation of the subject and object, requiring an understanding of the notions of up–down, left–right, front–back, higher-lower or nearer-farther; (2) interpretation of perspectives of three-dimensional objects, requiring the understanding of 2D and 3D representations of three-dimensional objects; and (3) orientation of the subject in real space, requiring the reading and interpreting of itineraries. In ORIESPA, simpler tasks are based on a quadrangular grid, where the front-back and left-right directions and the rotations of 90º, 180º and 270º play the main requirements. The more complex ones are produced on a cubic grid adding the up and down movements. In the first levels, the game's mechanics regarding the reading and interpreting maps (from point A to point B) is based on map routes, following a given set of instructions. In higher levels, the player must produce a list of instructions taking the game character to the desired destination, avoiding obstacles. Being an inclusive game the user has the possibility to interact through the mouse (point and click with a single button), the keyboard (small set of well recognized keys) or a Kinect device (using simple gesture moves). The character control requires the action on buttons corresponding to movements in 2D and 3D environments. Buttons and instructions are also complemented with text, sound and sign language.

Keywords : digital game, inclusion, itinerary, spatial ability

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