VIRION | Virtual Reality Applied to School Education

MATHS – GEOMETRY

A project funded by:

Erasmus+ sepie SERVICIO ESPAÑOL PARA LA INTERNACIONALIZACIÓN DE LA EDUCACIÓN

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With the participation of:

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MATHEMATICS VR EXPERIENCE – OBJECTIVES OF VIRION VR PROJECT

"Geometry and Spatial Visualization": Virtual Reality can help students visualize complex geometric shapes and their properties in a dynamic and interactive manner.

So, when designing this experience, we establish as the objective that students should be able to:

1.- Interact and experiment with some of the main **simple geometric shapes** (as: octahedron, torus, prism, cube sphere, etc....) while receiving information about them, such as their definitions, properties and formulas.

2.- Create and experiment with **complex geometric shapes** resulting from the interaction between two simple geometric shapes, through the use of Boolean operations .

MATHS VR EXPERIENCE CONTENT

So, we divided the experience in 3 phases:

Phase 1:

- Students will find a “belt” surrounding him with 11 simple geometric shapes (sphere, pyramid, cube, etc..) floating on it
- He will have to select them one by one, grab them and throw them into the “**ANALYZER**” in front of him. Doing that, student will be able to learn their specific characteristics and geometric properties as well as their basic formulas.
- To advance to analyze the next shape, student will have to answer a question related to this shape with the information provided to him in the previous screens.
- Once the 11 shapes have been analysed, student will need to place them into the “**COLLECTOR**” on his right to advance to phase 2.

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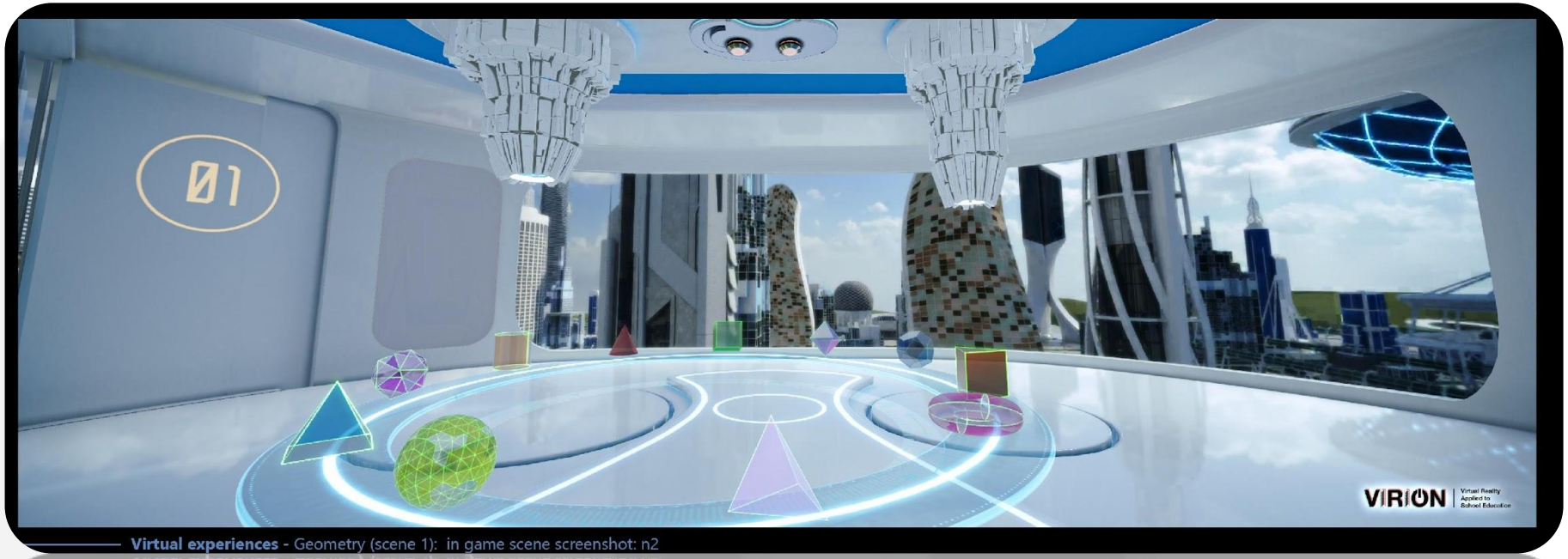
Phase 1 interface design:



Virtual experiences - Geometry (scene 1): in game scene screenshot: n2

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Phase 2:

- Once analysed the 11 geometric simple shapes by the students, and having placed them into the COLLECTOR, phase 1 is completed.
  Then the ship will take off and change the interface to start the phase 2.

- A operations table will appear in front of the student allowing him to:

  1.- Modify the parameters of the simple shapes on the left side of the table.

  2.- Create complex geometric shapes resulting from the interaction of two simple geometric shapes through the 3 Boolean operations (Intersection, Union and Exclusion).

Once at least 5 Boolean operations have been completed, phase 2 of the experience is finished.

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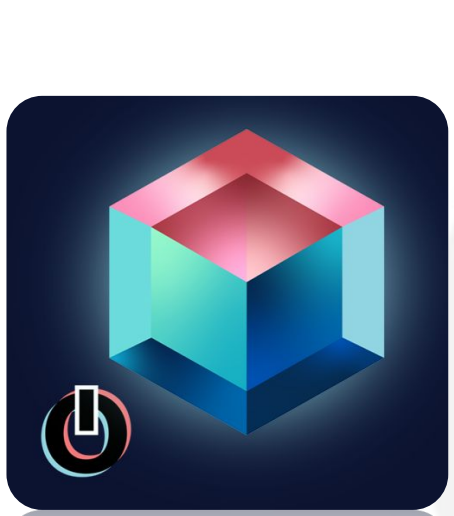
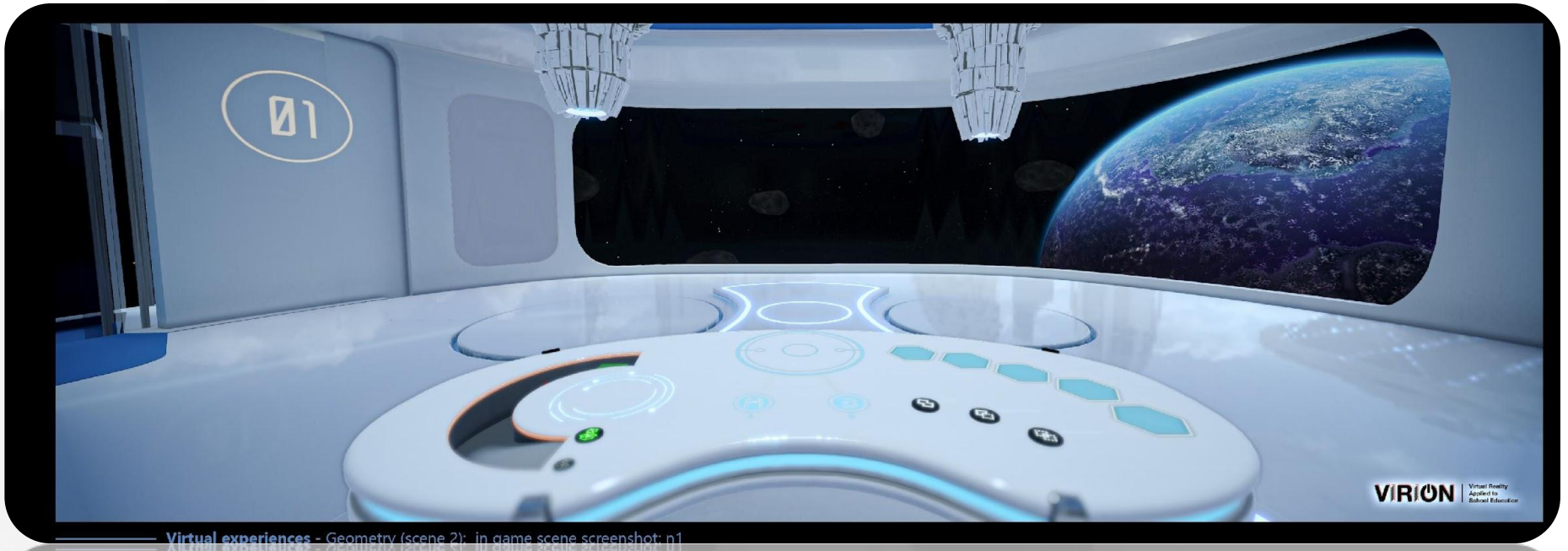
Phase 2 interface design:





Virtual experiences - Geometry (scene 2): in game scene screenshot: n1

MATHS VR EXPERIENCE CONTENT

Phase 3:

- Students will see that -once he created a minimun of 5 complex geometric shapes- on its right the wall will open, so he will discover some of the most advanced complex geometric shapes based on mathematic calculations and wich many of them only exist on the mathematics world

- Students will be able to take those shapes and manipulate them, what will be impossible in the real world

Once completed the 3 phases, student will obtain his **certificate of accomplishment**

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Phase 3 interface design: