# Research about the educational value of Smart Cubes in class

During schoolyear 2010-2011 we did some research in a kindergarten in Ooigem (Belgium). We tested how 59 toddlers, who have never puzzled 3D before, reacted on the Happy Cube puzzle model **Smart Cube**. Smart Cube is a very easy puzzle model, that consist of only two different kinds of puzzle pieces.

Our goal was to develop a pack/box directly usable in schools. The box will be accompanied by a booklet with all kinds of challenges for the children, with guidance for the teacher. We wanted to assure to bring a product tailored to schools and their precious toddlers.

x 6 colours

Super easy model Baubox

1 model in 6 colours

x4 + x2
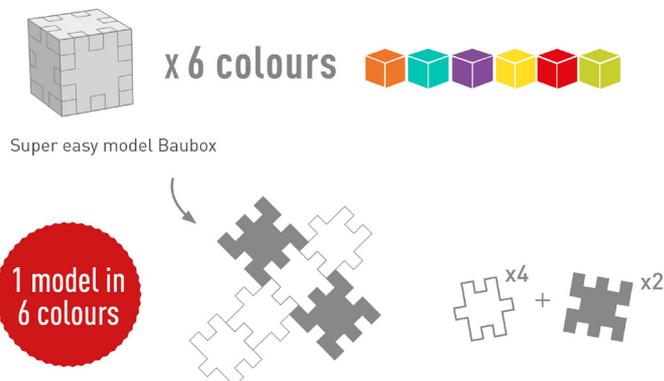
Our **research questions** were the following:

1. Are children of the second and third year in kindergarten (4 to 6 years old) capable to make the conversion from a 2D drawing to a 3D construction in reality?

2. What is preferred by the children as instruction? Words, drawings, outlines, or replicates?

3. To what extent are children capable of cleaning up the puzzles neatly? Is this too difficult? Do they lose their attention? How long does this phase takes?

Method

Observation

During several occasions we observed the toddlers. We observed mixed classes and classes with only children from the 2nd or 3th year of kindergarten (age 4 to 5 or 5 to 6 years old).

First the children were shown a picture of a perfect cube. Then they were challenged to make it themselves.

The results were amazing. The children were very enthousiastic about the game. In total 63% of the kids were able to make a perfect cube in 5 minutes time. Some children were on the right track, but delivered a cube with the corners not perfectly filled up. It was great to see how the children learned from each other.
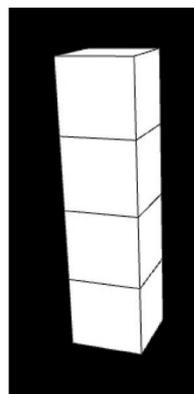
Second, the children were devided in seperate groups. Each group got a different instruction (only in word, as a drawing, in outlines, or as a replicate on paper), but the goal was always the same, namely to 'build a tower'.
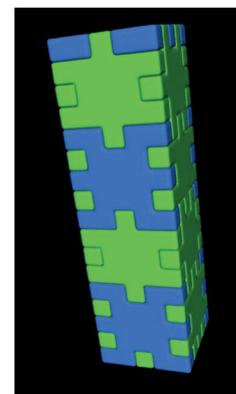
Many children were able to fullfill the task in a limited period of time. In total 39% of the children were able to make a tower of 4 blocks. Most succesfull was the 'outlinegroup', followed by the 'replicategroup' and the 'drawinggroup'.
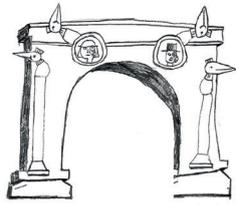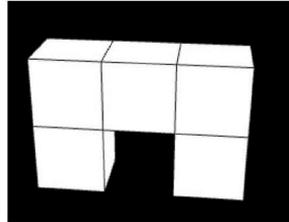

drawing   outline   replicate

Almost no children of the 'wordgroup' were able to complete the task succesfully.
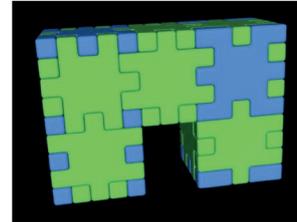
The **third** challenge was really difficult. All groups got a different instruction (only in word, as a drawing, in outlines, or as a replicate on paper), but again all with the same goal, to 'make a bridge'. This required them to make a complex 3D+ construction.

drawing

outline

replicate

Some children were very passionate. 12% of them was capable of finishing this challenge perfectly. The 'outlinegroup' and the 'replicategroup' were most succesfull, followed by the 'drawinggroup'. No child from the 'wordgroup' was able to complete the task succesfully.

Please note that we used a strict timeframe to make sure that comparison between groups was possible. Some children were very close to completion when the time was up. Certainly, when these toddlers had more time, more would have completed the challenges succesfully.

During the **fourth** and last phase of the observation, the cleanup, we asked the children to put the pieces back in their frame. We expected that some children might feel frustrated because they have to brake down their constructions.

Suprisingly the cleanup went very well. We asked the toddlers to fill up as many frames as possible. The nice thing was that the children who had some difficulties earlier, were all able to complete this 2D task. Like that all children ended with a happy feeling.

The conclusions of our research

1. Most children of the third year (5 to 6 years old) in kindergarten are capable to make the conversion from a 2D drawing to a 3D construction in reality. Some children of the second year (4 to 5 years old) experience little difficulties. Best results are reached when toddlers are situated in a context were they can learn from each other.

2. Toddlers prefer instructions as outlines or replicates. Teachers prefer replicates because they fear that kids will get confused, thinking that blocks need to be piled up.

3. Toddlers are capable of cleaning up the puzzles neatly in about 5 minutes time. This cleanup phase provides the opportunity for every child to feel happy and succesfull.

We wish you a lot of learning fun with the Smart Cubes!

Questions or comments? Mail to: **questions@happy.be**