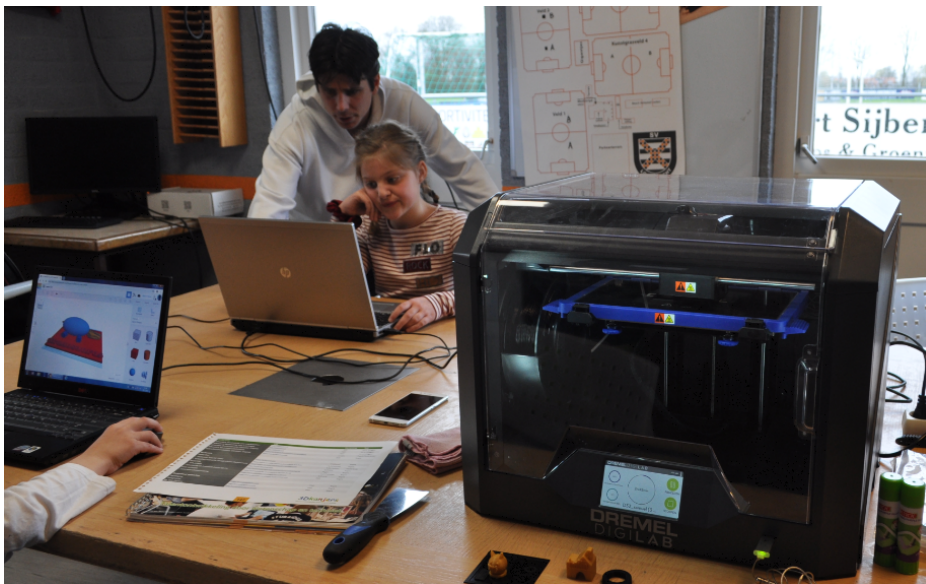


Creating and learning with a 3D printer at Eigen&Wijzer out-of-school care centres

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Eigen&Wijzer has 27 childcare centres that offer day care, preschool childcare, out-of-school care and childminder services. The out-of-school care centres focus on children from 4 to 13, in particular on their development. They enjoy a safe environment in which they receive individual attention from our educational assistants and are challenged to develop their talents and deepen and/or broaden their interests. They, in line with child participation, make suggestions for workshops and activities, for example 3D printing.



From the beginning...

We work together with a number of primary schools in Loosdrecht, including the Sterrenwachter Jenaplan school. The Sterrenwachter has a 3D printer that we, in consultation with the school, may also use at our out-of-school care centres with children from the age of 8. We invited 3Dkanjers' Remco Liefing to hold an information session to help us give our children the best possible support during their use of 3D technology. These 3D workshops are now given by Kevin, the centre coordinator and educational assistant in Maarssen, and by me (Laurens), educational assistant at the out-of-school care centre in Loosdrecht.

... to workshops at the out-of-school care center

The children and educational assistants draw up a new workshop timetable at the beginning of each activity period. Children can register in advance for these activities, for which only a limited number of places are available. We can coach a maximum of 8 children in the 3D printing workshop in Loosdrecht.



The workshop is divided into four sessions:

1st Session

Introduction to the computer and the 3D Tinkercad design tool

The children divide themselves into groups of two at the beginning of the session, and each pair takes their place in front of a computer. This approach promotes cooperation between the children, who can encourage and help each other in making their design. Technology can be exciting when it is new: the children quickly become amazed by the possibilities that are suddenly available to them.

This session focuses on an introduction to the tool. The children find out which shapes are available, such as rectangles, discs and triangles, etc., and learn how they can drag them to the workplane to adjust the shapes by enlarging or shrinking them, stretching or bending them, or increasing their height. I always ask them to create something with the shapes, and they come up with castles, name plates and footballs, etc. Tinkercad also offers a group of shapes with humanoids and skeleton parts. These are always the children's favourites during the first session. This first session often yields crazy, massive designs on the Tinkercad workplane. This is not a problem in this first session, as it helps the children to become familiar with the design tool and encourages creativity in thinking out of the box. At the end of the first session I tell the children that I would like them to draw up a plan before the second session in which they explain what they would like to make. I also give the children some practical tips about the possibilities offered by the 3D printer and the time that the printer will need to print a design.

2nd Session

Drawing up a plan: What would the children like to make? Starting work in Tinkercad

At the beginning of the second session children often say that they would like to make something like a pen tray, a mobile case, an object with their name on it, for example a name plate, or the model of a house. We now work out the designs for these ideas. The children are confronted with the challenge of making the design they had in their head. They often ask me questions such as 'How can I make it bigger?', 'How do I make a hole in the cylinder shape?', or 'How do I copy this shape?' I, as educational assistant, have the marvellous task of encouraging the children to think about their idea and how they can transform it into an actual design. Obviously, the child is in control ... so the child tries something out, and I help as necessary. It's 'learning by doing'.

3rd Session

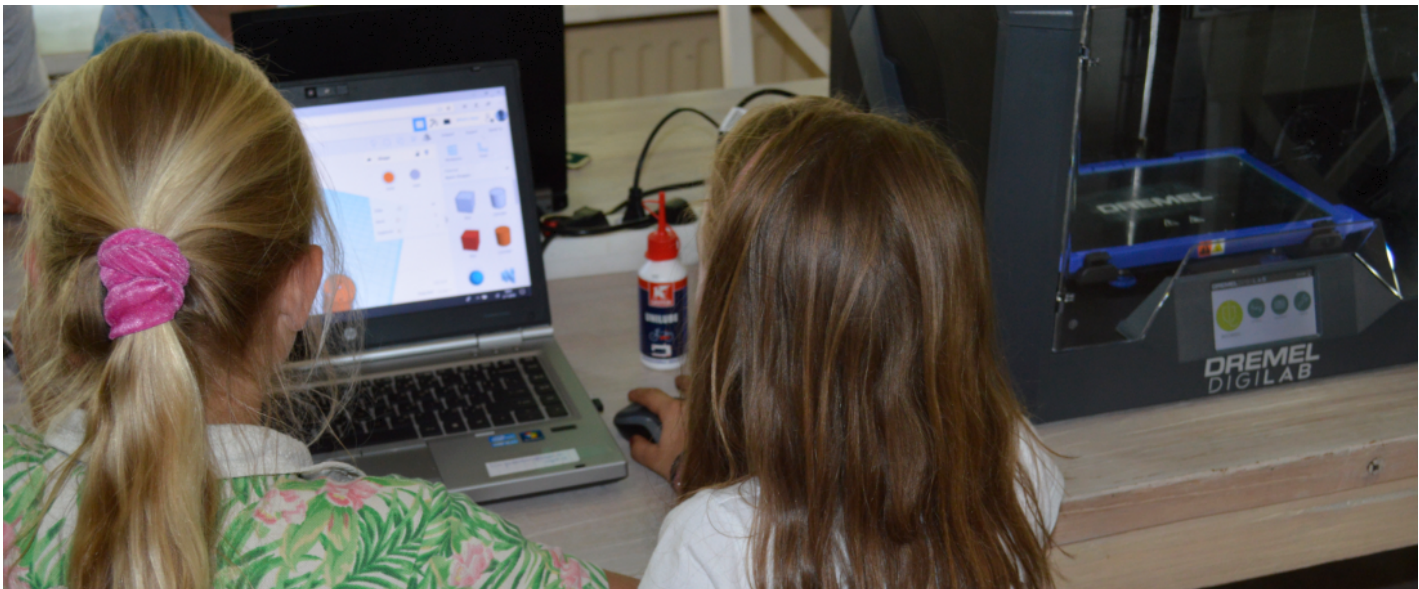
Working on the design in Tinkercad

During the third session the children continue to work on their design, which often goes very smoothly, as they have gained the necessary expertise during the previous two sessions.

4th Session

Completing the design and printing, when possible, with the 3D printer

The children find this fourth 3D workshop session super cool – they are going to see the 3D printer print their design! We use the Dremel 3D45 3D printer. We can usually print one or two designs during this session, as determined by the actual designs. The other designs are printed on the following days and then given to the children.



The objective of the 3D printing workshop

Our objective is to offer children at the out-of-school care centre a form of playful learning in which they experience how they can work with others in coming up with creative ideas and how they can develop these ideas into designs. At the same time, they need to take account of a range of limitations that in turn result in new ideas and designs. We wish to encourage this learning by discovery. We also wish to awaken children's curiosity about working with computers, help them learn how to make a design with a 3D design tool, and let them discover the technological options offered by a 3D printer.

We intend to help children who are really interested in this creative process to continue to develop their talents in follow-up workshops we plan to organise in the future. They will be asked an open question, 'How can you use a 3D printer to solve a problem?'

The 3D workshop is an ideal fit with Eigen&Wijzer's vision: it is innovative, challenging, encourages a problem-solving approach to thinking, and allows children to discover their talents.