

**Visio** 

**Visio** 



Start



# Innovation in Education

Summary of innovations in Education at Royal Dutch Visio

Evert Rasing

we live in a time of big possibilities...

Evert Rasing

**innovator and project manager**

Royal Dutch Visio, in the Netherlands.

At Visio we are always looking for ways to improve education for Vi learners in the **most modern, high tech and just highest quality** of education for our students.



## Topics in Innovation @ Visio



1. 3D printing for VI
2. Mathematics
3. Digital literacy

Visio is an expertise center for people who are blind or visual impaired.

**rehabilitation & advice department,  
a residential guidance and daycare division  
and education.**

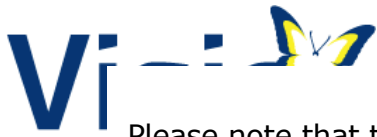
I work for education.

We have 5 special schools for VI divided across the Netherlands, but **education also involves guidance for VI learners in regular school.**

we serve a bit under **2500 students.**

innovation **today** can be divided in three different topics:

- 3D printing for VI
- problems in accessibility in Mathematical
- Digital Literacy



Please note that there are much more activities in innovation at **ViSiO**

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### 1. 3D printing for VI



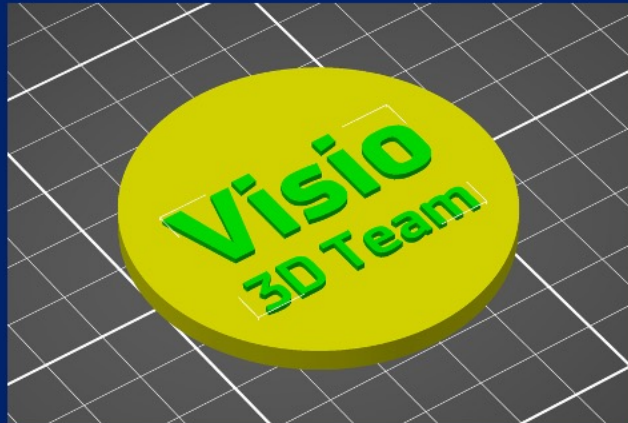
3D printing is a method of manufacturing  
very useful and succesful in education for VI.

make certain concepts or figures tactile in 3D  
also allows you to simplify a model or  
add structures or braille for example.

Currently we are working with 3D print in different  
projects:

## 3D printing for VI

Visio 3D Team



The Visio 3D team is a continuous project that allows every one of our 5 schools to 3D print models for their school.

Every school has 3D Printers  
we train several colleagues at the schools to operate them  
at the same time inform everybody at Visio Education  
about where they can find existing models and how they  
can get a print into their hands or classrooms.

Also, we design and develop our own products in this  
project. For example I will show some of the bigger  
projects or products

## 3D printing for VI

### Braillebox



### *Visio Braillebox with numbers and letters*

This box contains all materials to teach braille to a young learner (4 years and up) all materials in the box are CAD-designed.

It contains hundreds of blocks with all numbers and letters in braille. Together with a holder to make four lines with words or sums

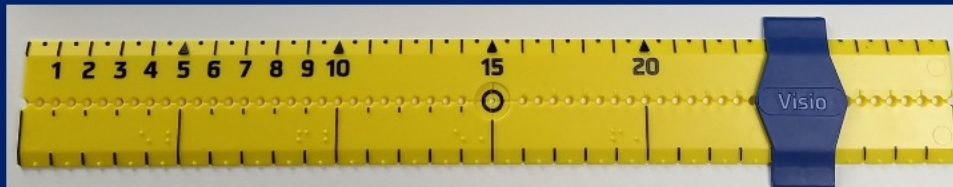
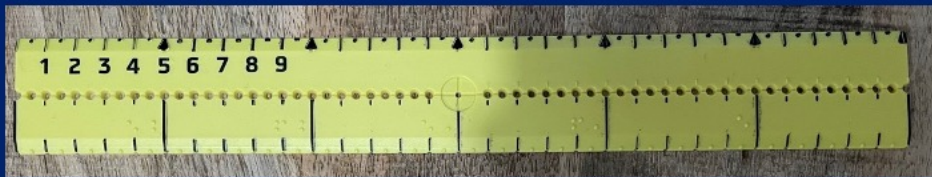
It also contain jumbo braille for teaching the very start of reading braille.

All products are 3D printed or laser-cut.

<https://www.eduvip.nl/visiobraillebox/>

### 3D printing for VI

#### Tactile ruler (VIER-Ruler)



We produced a ruler because the rulers we were used to were no longer produced.

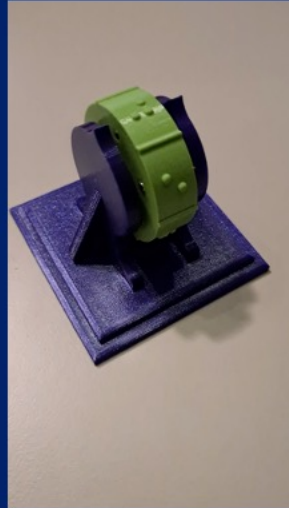
The VIER-ruler has four functions:

- measure lines for braille-users
- measure lines for low vision users
- draw lines with the blue drawing tool.
- draw circles for braille users

<https://www.eduvip.nl/liniaal/>

## 3D printing for VI

### Tactile dices



There has always been a high demand for tactile dices. Normal dices aren't really successful (you have to search for them when you roll them and braille is difficult to print in 6 directions).

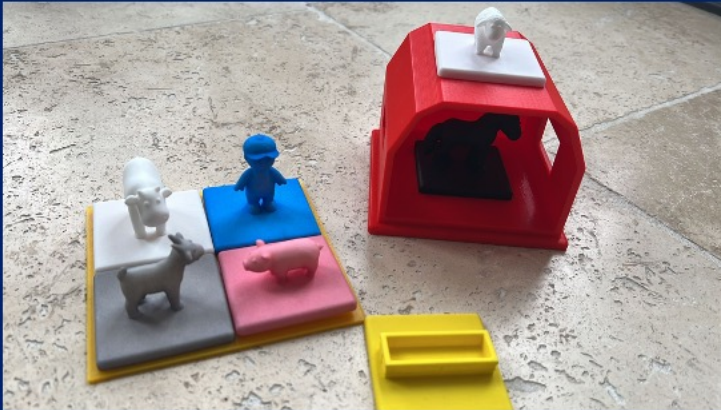
We are very happy with this rotating dice. It is also very addictive to spin.

We share the 3D models online for free because in our vision everybody around the world should benefit from our best practices.

<https://tactiles.eu/3d-model/rotating-braille-dice/>

## 3D printing for VI

Projects: Ik & Rik, InZicht



In Ik & Rik, a student can learn concepts of positioning of bodies.

Is somebody in front of, next to, on top, inside or behind another body. All products are 3D printed or laser-cut.



In the 3D4VIP project we are creating a platform for 3D printing for VI.

Not only is it your Go To database for finding 3D Models for education for VI, you can also find guidelines that help you design for VI.

The website is **www.Tactiles.eu**. I am very proud of this website and its potential to grow as a database. We need everybody in our field who has 3D models to upload.

We kindly ask you to take a look and contribute to the website by uploading 3D models you might have. You can make an account and upload everything you want. You are guided by forms on the website what to fill in where.

We are looking forward to also add lesson plans to design with blind learners and upload awareness videos on 3D printing for VI as well.



Some models I designed in this project:

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## 3D printing for VI

### Animal Cell that splits open



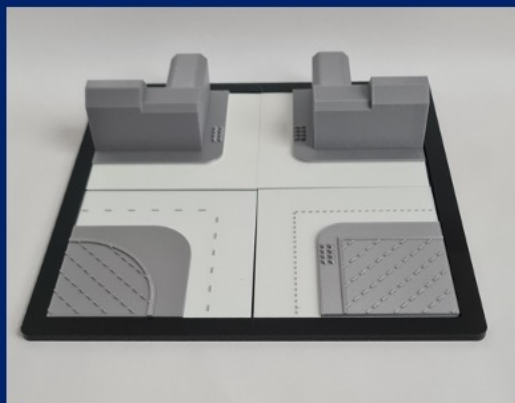
21 cm in length

15 cm height

Uses magnets and 3d Prints with iron to keep everything in place.

### 3D printing for VI

Tactile Traffic Junctions For Orientation & mobility



30x30 cm

### 3D printing for VI

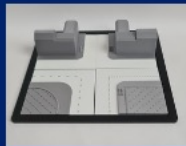
#### Cross-Multiplication Calculator Blocks



Cross multiplication is a calculation method which can help you in countless situations. This blocks can help you as a nin sighted user.

## 3D printing for VI

### 3D4VIP



3D-Models and  
Tactile Graphics



Guidelines

The website is [Tactiles.eu](http://Tactiles.eu).

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## 2. Mathematical problems



Math is an important but difficult subject that has many elements in it that are hard to make accessible. A lot of these problems we are trying to find a solution for in different smaller and bigger project at Visio.

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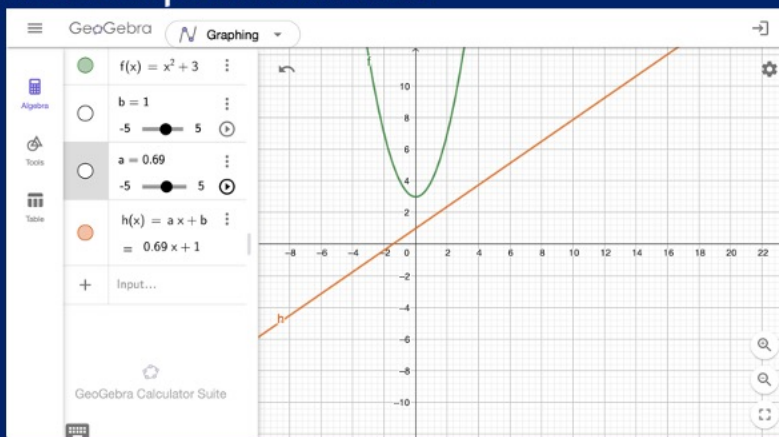
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## Mathematical solutions

### Accessible Graphical Calculator



One of the difficulties is a well accessible graphical calculator.

we started a project 2 years ago in which we assessed all of the available physical and digital calculators. We saw some very poor accessibility in general. On the other hand we saw that the calculators that are very accessible don't have all the functionality.

Therefore, we reached out to one of the most promising and functional manufacturers to cooperate and improve their accessibility. This company is GeoGebra, which is a worldwide respected calculator tool that invests on accessibility. We are still working together and we expect to get accessibility to a workable level somewhere in the next six months.

[Geogebra.org](https://www.geogebra.org)



## Mathematical solutions



### SenseMath app

**Making Sense of Math with audio graphs**

**Accessible math**  
Type functions like:  
 $x^2+1$   
And it will render as you would write it:  
visually, in speech and braille  
 $y = x^2 + 1$

**Custom VoiceOver rotor settings**  
Adjust what audio elements you hear on the fly, while listening  
Make sense of the graph, step by step

Developed by VoiceOver experts (for everyone)  
+ Magic Tap to play  
+ Custom Rotor for audio elements

Listen to a graph with an interactive way to adjust what information you want to hear  
Stereo sound effects from left to right (headphones advised)

In mathematics, there are a lot of graphical representations which cost much time to explore and understand for a blind user.

Visio developed the free SenseMath app for iOS which uses sonification of the graph to understand the main representation of a graphic.

This can save 6-10 times the time to explore a mathematical graph. You can draw your own graphs or Dutch students can add all the books they encounter during their high school career.

It is an award-winning app, recognized in the Netherlands and last week we were announced finalists in World Changing Ideas by Fast Company, a American Business magazine.

Download for free at Appstore:



<https://apps.apple.com/nl/app/sensemath/id154625776>

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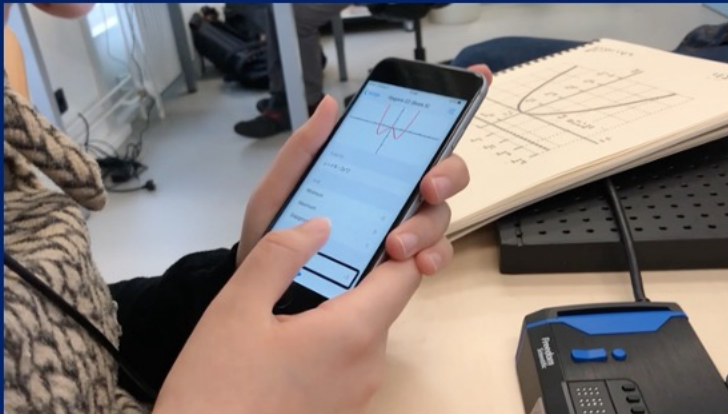
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### 3. Digital Literacy

Digital literacy is a general topic and fairly new. At Visio we developed a curriculum Digital Literacy that is accessible for low vision and Blind users. It involves accessible programming based on the four pillars:



## Digital Literacy

### Curriculum

- IT Basic skills
- Information skill
- Media literacy
- Computational Thinking

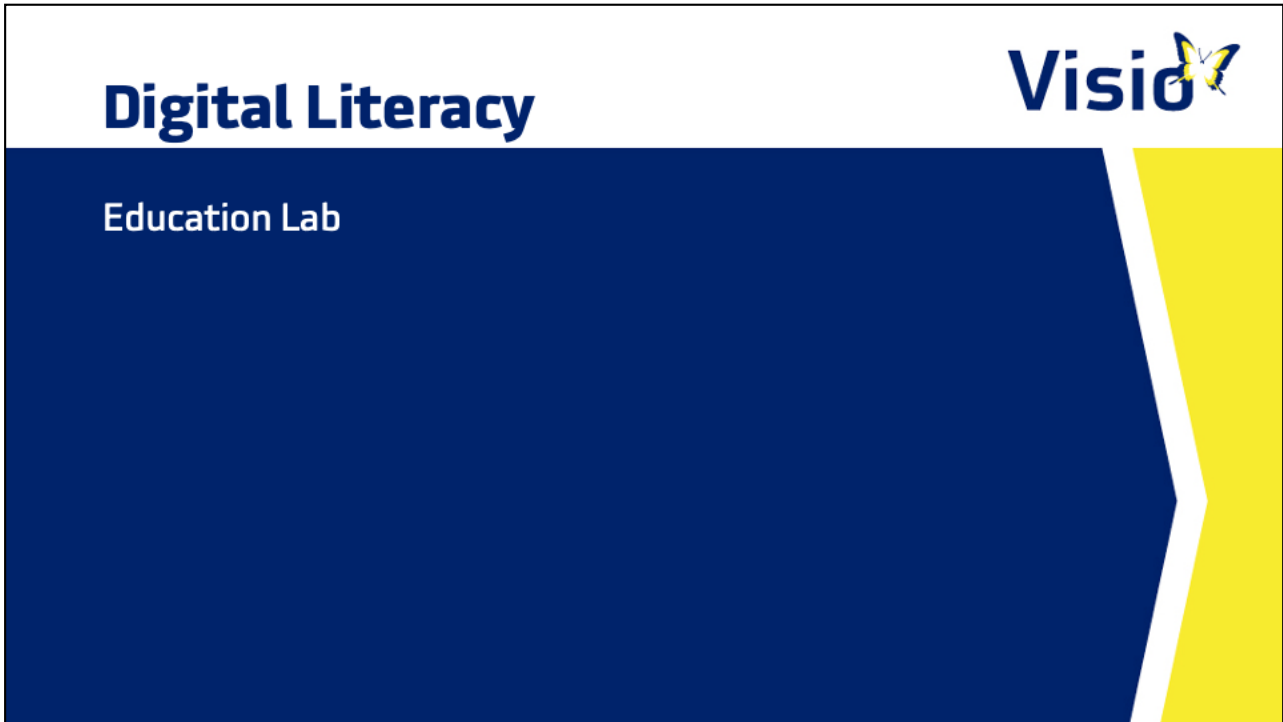
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More info in dutch: <https://www.eduvip.nl/digitale-geletterdheid-algemeen/>



VisioLab allows every Visio employee to explore new, existing technology that might be beneficial for education in VI. It is not a physical lab, but a collaboration that enables everybody at Visio to explore new technology. Think of Motorised Drawing arms, adaptive controllers for games, audio-devices, robots etc.

<https://www.visio.org/professional/expertise/onderzoek/n/digitale-ontwikkelingen-innovaties/visiolab/>



The education lab is a physical room that is currently under construction at our Visio schools. In the education lab a student can explore the new technology in a classroom setting. We are hoping to start with these settings next year.



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