

# The influence of a 3D pen on the Art world (Part-2)

By Ruud Janssen – November 2014

After writing Part-1, I also distributed the text and published the photos and thoughts on Facebook, the IUOMA network (<http://iuoma-network.ning.com/>) and on several Groups and Forums. That normally tends to give some reactions and ideas too for new developments. I also have reached the new ways that the 3D pen shows us online and focus on that in this article.

On the Internet I even found a Case study about the use of the 3Doodler Pen in the English Education (St Augustine's Catholic High School, Redditch, Worcestershire, UK) called: "**3Doodler EDU Debut, Differentiated Learning in Three Dimensions**"<sup>1</sup>.

The summery says a lot:

A recent pilot project conducted in the UK demonstrated how new and emerging technologies such as the 3Doodler can enhance, shape and influence an educational setting in a variety of ways; as well as encourage students to take on new challenges. The program specifically highlighted how the 3Doodler can be used to:

- Incentivize performance amongst students;
- Diversify teaching methods within the classroom;
- Stimulate kinaesthetic and visual learners;
- Enhance the performance of divergent thinkers;
- Improve concentration amongst students, including those with ADHD; and
- Level the playing field between male and female students, especially in the sciences.

This case study looks in detail at the goals, methods, and outcomes of the pilot project, and also highlights feedback from both students and teachers who participated

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<sup>1</sup> <https://www.dropbox.com/s/wsfzg85vx7duvyg/St.%20Augustine%27s%20Case%20Study%20FINAL.pdf?dl=0>



That the visual learners have an advantage also indicates that this new tool also will have a major impact on the artists world when a new generation of artists picks this up and starts to integrate in their work. Producing your own plastic in a random way is really something new.

For the use in Art & design they write:

### **Art & Design**

*Art & Design is one of the most natural places for the 3Doodler to be used, and needless to say the Doodler was well received in art lessons, where students produced incredible creative works. The 3Doodler was employed in art and design classes as both an everyday tool and for the specific creation of exam pieces. In one instance, students were given instructions to create objects to decorate the human form - a very broad mandate. The students' creations ranged from jewellery, to rings, and eccentric glasses that were made as a homage to Dame Edna, the beloved Australian comedian.*

*In these exercises the 3Doodler took the place of traditional materials such as pipe cleaners, paper, card stock, glue, crepe paper and tissue paper. The 3Doodler has also been widely adopted in other schools across the UK and in the US within art classes for the purposes of sculpting, model making, pre-CAD drafting, as well as canvas work and the re-rendering of well-known 2D works of art into 3D.*

Source:

<https://www.dropbox.com/s/wsfzq85vx7duvyg/St.%20Augustine%27s%20Case%20Study%20FINAL.pdf?dl=0>

Since the 3Doodler is the first 3D pen and was developed in the UK, you can see the first impacts in society already there. I am focussing on the influence it has for artists, and also am writing on the influences it has on me as a multimedia artists. Once you see a new tool for the network, how does it influence the network and the art / concepts we produce. The article surely underlines there is a major change with the 3D developments.

Another interesting thing. The MoMa in New York has an online shop and even sells the new 3Ddoodler pen there. So they see it too as a new development (see:

[http://www.momastore.org/museum/moma/ProductDisplay\\_3Doodler\\_10451\\_10001\\_177071\\_1\\_26674\\_46162.](http://www.momastore.org/museum/moma/ProductDisplay_3Doodler_10451_10001_177071_1_26674_46162.))



The introduction of the 3D pen has also started the changes on many fronts, and only through the social media you can see this. On YouTube there are lots of videos and tutorials on how people

started to use the pen. The technique is simple, but a steady hand comes in handy. I notice the influences on the use of the pen:

1. Type of plastic
2. Steady hand or not
3. Speed of extrusion of filament (is it adjustable?)
4. Do you copy or create?
5. Do you use gravity as a factor in the work?
6. Do you use templates and make 2D works which you 'paste together' into 3D
7. Does the transport of filament and power limit your movements?
8. Do you use chance as part of the process?
9. What colours do you use? Monotype, bright colours? Do you have access to the complete pallet of colours?

I will explain these factors a bit more:

### 1. TYPE OF PLASTIC.

There are many sorts of plastics, but most 3D pens can only handle ABS or PLA. The other sorts are mostly developed for the use of a 3D printer since there the temperatures, details and extrusion are arranged in details though the software and adjustments.



An overview of the several types of plastics I found on the website of Sculptify (see: <http://sculptify.com/>) is another Kickstarter project for 3D printers where they go back to basics and indicate what the components are.

Also what they cost, and what the Flexibility and Density are. The 3D printer itself uses no threads of plastic but the little corns that are melted. ABS is less flexible but has high density, PLA is more Rigid bet less density. Maybe in the future a pen also will be filled like this.....

1KG	Material	Flexibility		Density		Status
		Flexible	Rigid	Low	High	
\$18	PLA	○	●	○	●	Pre-order
\$18	ABS	○	●	○	●	Pre-order
\$22	TPU	●	○	○	●	Pre-order
\$22	EVA	●	○	○	●	Pre-order
TBD	HIPS	○	●	○	●	Optimizing
TBD	HDPE	○	●	○	●	Optimizing
TBD	Nylon	○	●	○	●	Optimizing
TBD	PC	○	●	○	●	Optimizing
TBD	Wood Composite	○	●	○	●	Optimizing

Test material properties shown, may change without notice.

On the 3Doodler site they give a list of the preferences (see image next page)

From 3Doodler Forum:

# ABS PLA HEAD TO HEAD

Which plastic should you get for your 3Doodler?

There are two types of material available for the 3Doodler, ABS and PLA. In this infographic we take a look at 3Doodling with each of them.

\*Early Prototype

## USING ABS & PLA WITH THE 3DOODLER

Operation What are you using your 3Doodler for?	ABS	PLA
<b>Drawing acute angles/edges</b> Angles less than 90 degrees	<input type="radio"/>	<input checked="" type="checkbox"/>
<b>Drawing upwards</b> Straight up in the air, or spirals	<input checked="" type="checkbox"/>	<input type="radio"/>
<b>Building structures</b> Freehand 3Doodling, plastic on plastic	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Creating bendable art</b> Need some flex in your 3Doodle?	<input checked="" type="checkbox"/>	<input type="radio"/>
<b>3Doodling on paper and then peeling</b> For creating amazing 3Doodles from stencils	<input checked="" type="checkbox"/>	<input type="radio"/>
<b>3Doodling on paper for long lasting stick</b> Want your 3Doodle to stay stuck to that paper?	<input type="radio"/>	<input checked="" type="checkbox"/>
<b>3Doodling on glass or metallic surfaces</b> Time to get mixed medium! Works on ceramics too	<input type="radio"/>	<input checked="" type="checkbox"/>
<b>Creating translucent art</b> Creating some semi-transparent 3Doodles?	<input type="radio"/>	<input checked="" type="checkbox"/>

## WHAT WE LIKE TO USE THEM FOR

### ABS

3Doodling from stencils (like our Eiffel Tower), making bendable items (like jewellery or a tiara), spirals, and drawing upwards off the page.

### PLA

3Doodling on windows, metal, and an array of other surfaces (it sticks better), and for those lovely translucent 3Doodles.

## **2. STEADY HAND OR NOT**

Because the speed of the extrusion isn't that high, you need a steady hand for straight lines. It is as simple as that. Any interruption of the movement means the overflow of plastic comes out and will form the shape the way it can. If you copy things, this is a major factor, keep the speed steady. If you create, this is exactly the factor that gives you very nice structures if you would like to. In my first experiment with 'the drawing of envelopes' I realized that when I was a bit tired and my hand wasn't that steady, the extrusion started to work out random forms. At the end, that was something that actually worked out very well indeed. The uncontrolled structures that were created give the forms a life of its own.

So, a steady hand is needed for the specific line. But a (forced) unsteady hand can give the most beautiful random forms. For the 'hobby' world the steady hand is what causes people to stress in the results. In the 'artists' I see that the randomness is embraced and that the 'chaos-theory' works here splendidly. The eye sees and interprets all forms, we only have to create the forms in the right way.

## **3. SPEED OF EXTRUSION OF FILAMENT**

The speed is in most 3D pens adjustable. The new LIX pen works on improving the speed. But since the filament needs to harden, the time factor works in two ways. If you work really 3D, the tread only holds after a few seconds, and before you build further onto that thread, you sometimes just have to wait a few seconds.

For drawing lines, the speed of extrusion also means a thick or thin line. A nice experiment is to just let the filament come out of the pen into the air at full speed and see how thick the tread gets. Also try this at the lowest speed and you will see the influence on the thickness of the plastic line. A scientist could do some nice experiments here and create tables of the effects...

## **4. DO YOU COPY OR CREATE?**

For me an essential question. I have said before. In my eyes the 3D pen was conceived as a marking product for the masses to make them interested in redoing templates and creating plastic things themselves. I see it on the internet, the Eiffel tower is rebuilt a few times, and leaves just very little to the imagination. All you need it to use the new techniques and you are ready. But for my interests the creating new part is more interesting. As a conceptual artist I like the new addition to my pallet.

In the concept 'PEN' is hidden that you write, but with this pen you actually produce plastic in a form that you are controlling yourself. Unlike the 3D printer not the computer, but the human is in charge again and can produce any plastic object in any colour he likes.

It is typical the artist that wants to create new things and show what the current times are all about. Traditional artists used the traditional techniques, multimedia artists use several media that are available, and with the plastic component a new dimension has been added.

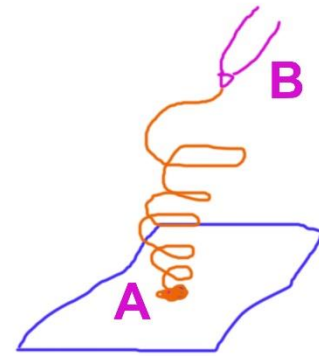
When I look through the videos and images of created work I make the difference immediately. Someone copied, or someone is trying out the new possibility. The creativity comes from the head, not from the new tool.

## **5. DO YOU USE GRAVITY AS A FACTOR IN THE WORK?**

Because of my background with 6 years of Physics, I automatically see the element gravity in this new tool. Plastic that is in the flexible phase will be affected by gravity, and that force will only have effect

in the flexible form. As the plastic becomes more hard, the effect gets less, and in the end phase only the mentioned flexibility (ABS : moderate rigid and PLA : Rigid) has an effect on larger structures.

When you try to make a spiral into the air from the ground into the air this is demonstrated the best. You make a fixation point on the table (more plastic means more weight and brings the best fixation point). When you go into the sky the gravity is challenged with a counterforce because the plastic is still held by the 3D pen itself. In the drawing I tried to make it clear. A is the fixating point. B is the holder of the plastic (the 3D pen). And when the gravity force on the plastic is compensated by the counterforce of the pen, it stays in the line you pull it. If you do this in the right timing, the plastic that hardens becomes the new fixating point....



This only works till a specific height though. The forces in a unstructured spiral are difficult to predict.

Also when you want to make a cube and things like that, you need to get used to control these forces. Gravity pulls things down, and you will have to find ways and techniques to control that (or even if you like the effect: use it).

## 6. DO YOU USE TEMPLATES AND MAKE 2D WORKS WHICH YOU 'PASTE TOGETHER' INTO 3D?

Because this gravity is so difficult to control, the use of 2D elements in a work that are 'glued' together in a 3D object works very well. For the sticking of 2 components together you can easily use the same filament and the 'well' becomes part of the object. You can also change the filament so an extra element is added. Have seen artists trying to make transparent additions that work very well. Also I immediately think of using transparent filament as a 2D structure that becomes transparent in the final object too.

The 3Doodler was the first to come with these templates for 'the masses'. As said before, for the consumer market this will work and the 'hobby' users and buyers will have great use of these templates. For artists it goes the other way. They really need templates in their work, and will start to make them fit to the things they want to create. Like #4 in this list, it depends on whether you want to create or copy. Nothing wrong with copy something to learn the techniques. In my definition that is however the difference between art and hobby. Have you created something new, or did you make a copy of something that was thought out by somebody else. Not a clear definition here, but I hope you understand what I mean.

## 7. DOES THE TRANSPORT OF FILAMENT AND POWER LIMIT YOUR MOVEMENTS?

The 3D pen says that there are no limits to the works you create, but there are a few limitations you will have to deal with. The 3D pen itself needs power. So the length of the power cord and whether it limits your movements is a factor.

A second factor is the transport of the filament. On the original 3Doodler they choose sticks as basis for the input of plastic. So at certain moments you need to put in a new stick. On the newer pens they work with also filament 1,75 mm from a role. It means you can have large amounts of plastic available if you make the input flexible. In my first attempts I sometimes got the situation that the transport became a problem. I need to have a holder for the filament-role so that the transport won't bother me when I work. I noticed that others also are thinking of tools to make the work

easier. In the next generation of pens (like the LIX) they try new things, like a USB connection for the power, and we will see how the developments go.



Photo above: someone using the quite large original Doodler 3D pen. The limitation because of the use of sticks is there a major one

Photo below: someone using the new (not yet available) LIX prototype pen. The USB connection should make the movements with a cord better....



## 8. DO YOU USE CHANCE AS PART OF THE PROCESS?

For me the most interesting thing in art is also the chance factor. Also when using ink and paint I always experiment with the chance of certain ways of working. With the 3D pen I see lots of new things can test and do. Already with the first basic attempts I noticed that the way the plastic is pushed out of the extruder also means you can use this effect because the plastic must find a way to fit in the structure.

So the basic things I want to say now is: give chance a possibility too. Don't let others give the limits on how to work, try and test and find new ways.

## 9. WHAT COLOURS DO YOU USE? MONOTYPE, BRIGHT COLOURS? DO YOU HAVE ACCESS TO THE COMPLETE PALLET OF COLOURS?

The basis colours of filament are bright and colourful.



The new developments also brings a new range of colours you can use. Gold and metal like, transparent, and any colour you can think of. There are also filaments that have a colour depending on the temperature the object has. That brings a lot of new possibilities.

This second article was a bit more of an overview. I am orientating on what is possible. I know that many others will go in different directions, and we will find new ways of using this too inside the art world too.

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