

DESIGN AND PRODUCTION OF PLASTIC PARTS FOR READ-WRITE DIDACTIC EQUIPMENT USING 3D PRINTER



A. Ciubară¹, Ș. L. Burlea², M. Axinte³, R. Cimpoieșu³, D. L. Chicet³, V. Manole³, G. Burlea⁴ and N. Cimpoieșu³

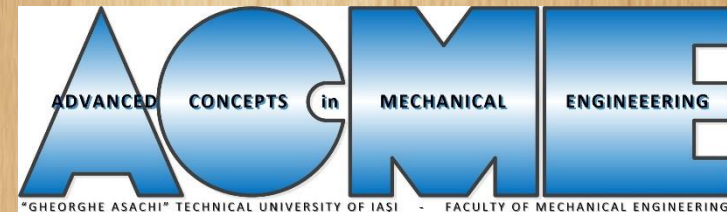
¹Psychiatry Department, Dunarea de Jos University, Galati, Romania

²Dental Prosthesis Technology Department, University of Medicine and Pharmacy "Grigore T Popa", Iasi, Romania

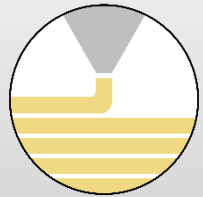
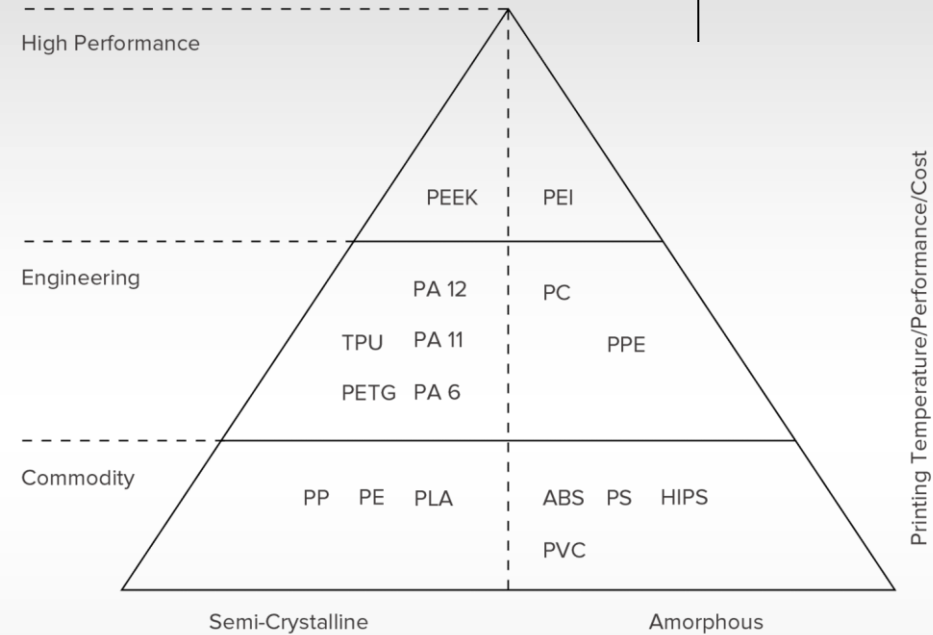
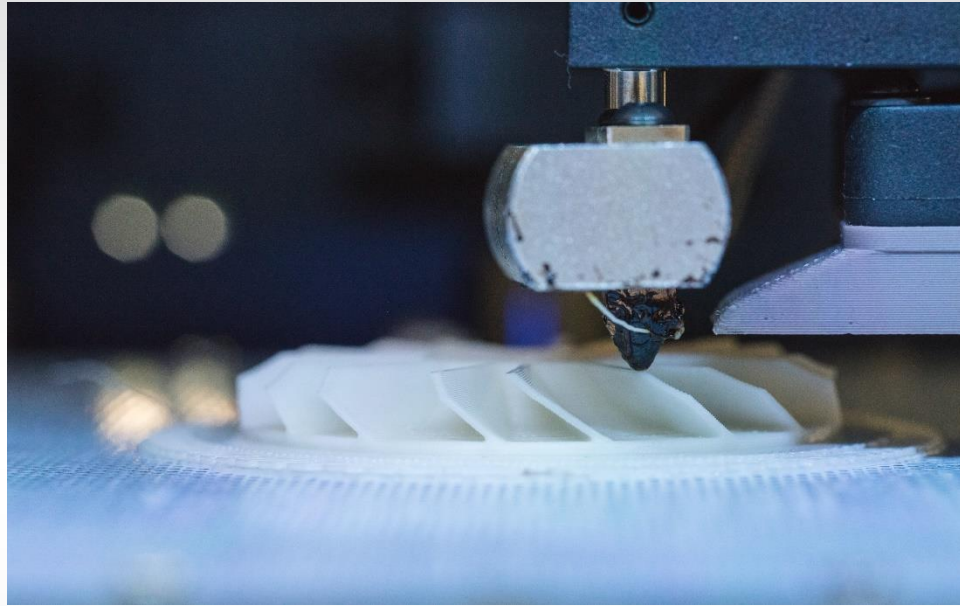
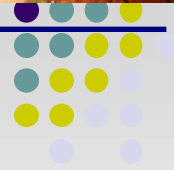
³Materials Science Department, "Gheorghe Asachi" Technical University of Iasi, Iasi, Romania

⁴ Helicomed, Iasi, Romania

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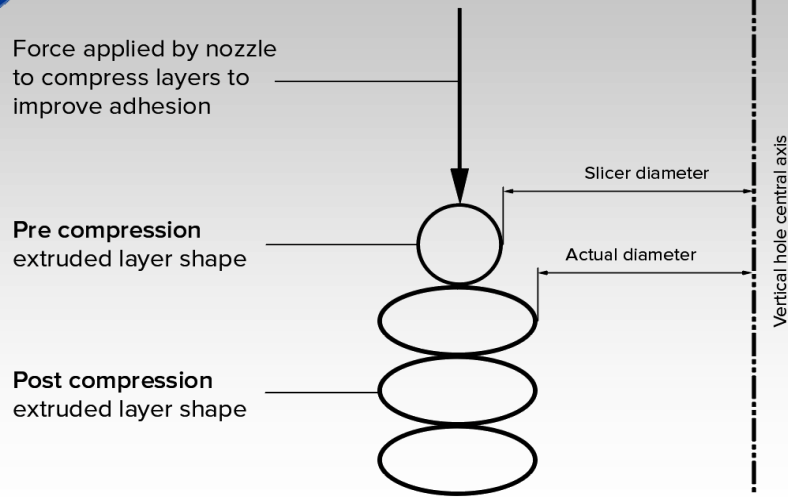


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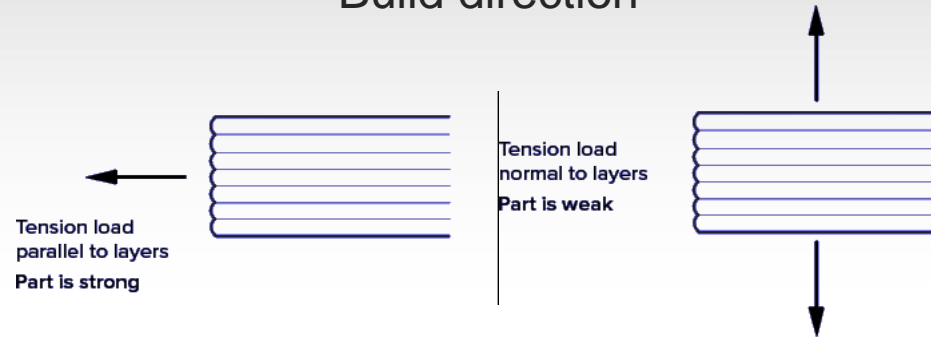


FDM is the most widely available 3D printing process, mainly used for low-cost prototyping and design verification with very fast turn around times.

Similar to how toothpaste is squeezed out of a tube, material extrusion technologies extrude a material through a nozzle and onto a build plate. The nozzle follows a predetermined path building layer-by-layer.



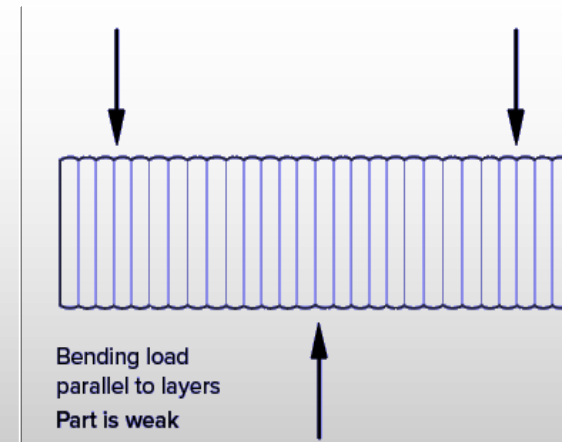
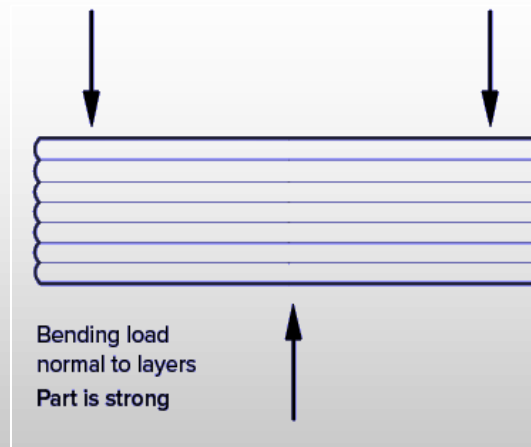
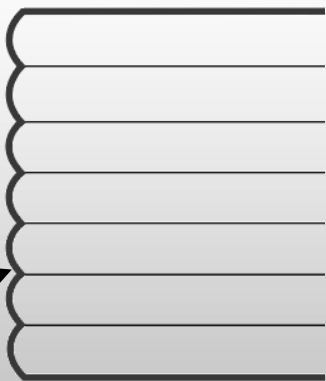
Build direction

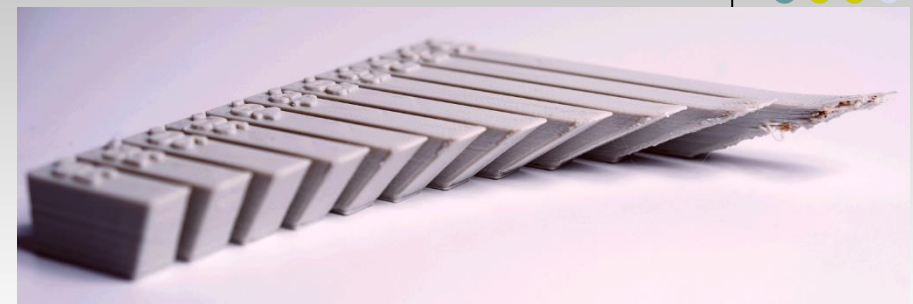
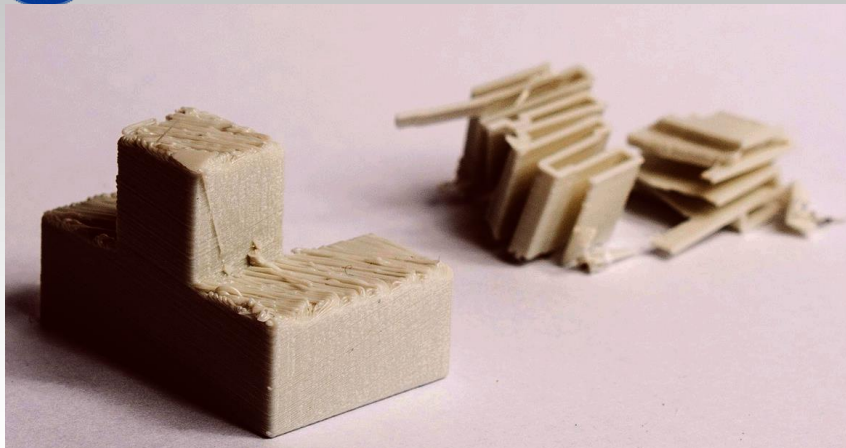


The variation in slicer program vs. actual diameter of vertical holes is due to compression of the extruded profile

Layers with radius on its edges

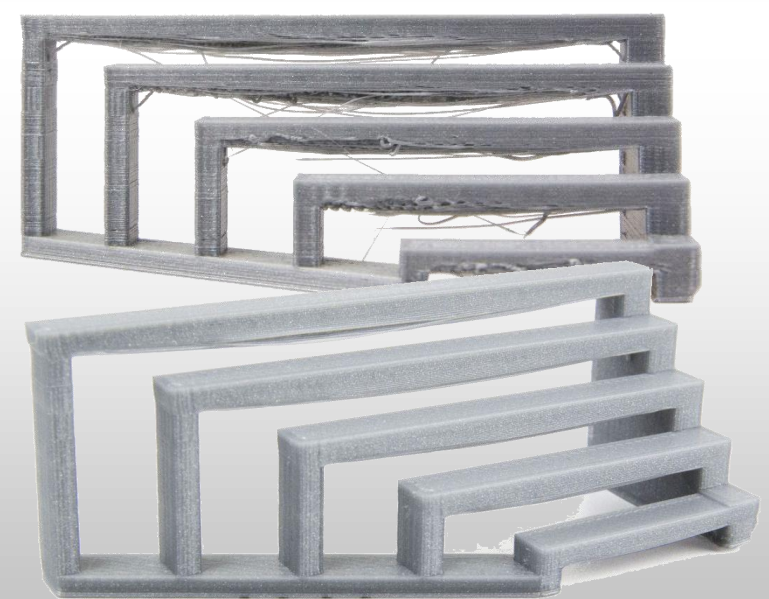
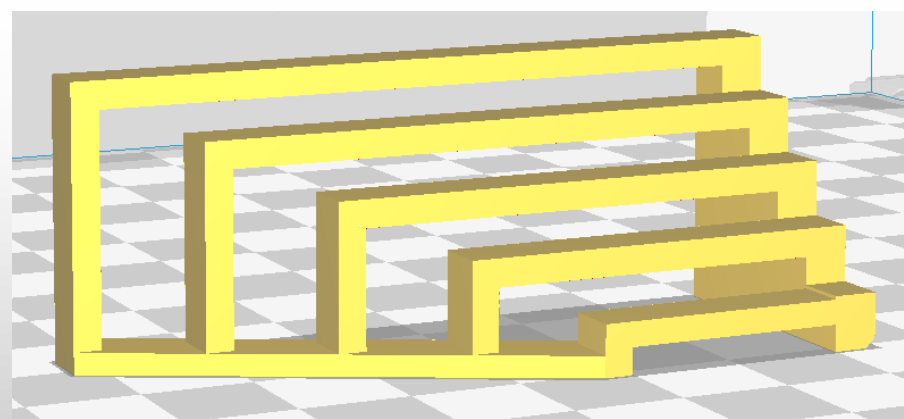
Notches create stress concentrations at layer edges



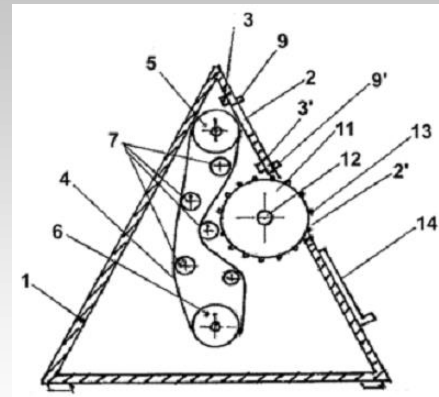
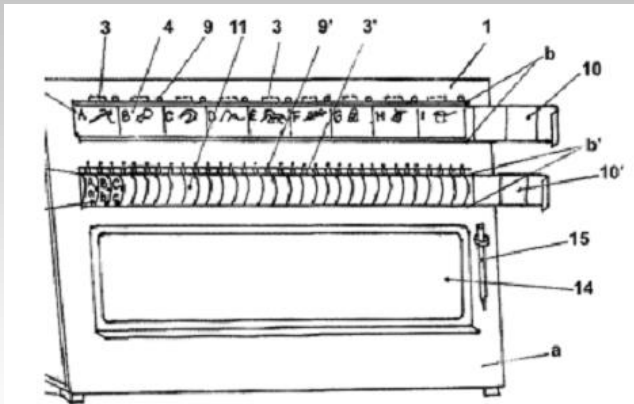


The effect of increasing **overhang** angle (in increments of 5 degrees) on print quality. Max. angle shown is 70 degrees

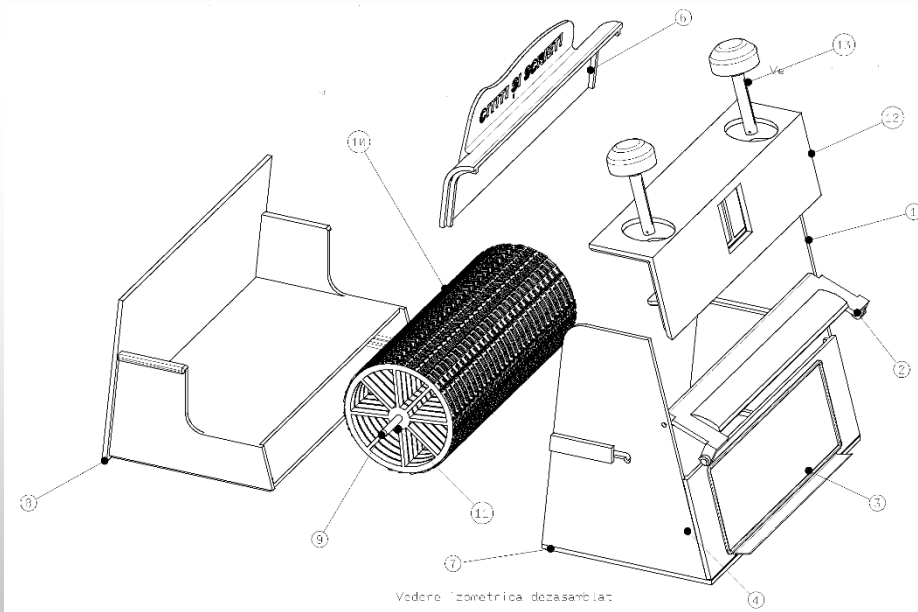
FDM printed puzzle piece with **support removed** showing surface roughness



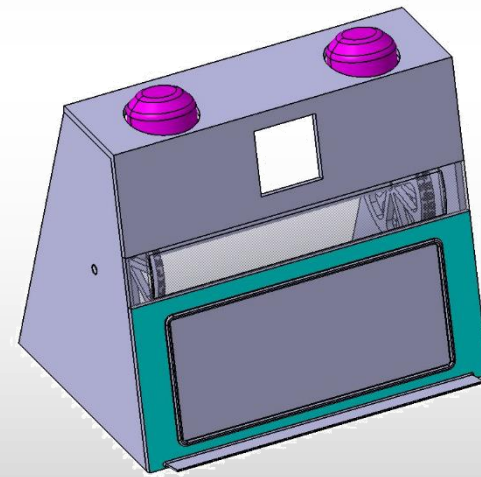
Comparison between virtual model and real 3D printed part, **Bridging** influenced by speed and temperature



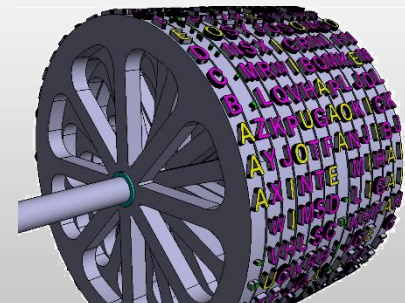
Reading/writing device, initial sketches according to patent RO 120992



Prototype exploded assembly model



Prototype 3 D model

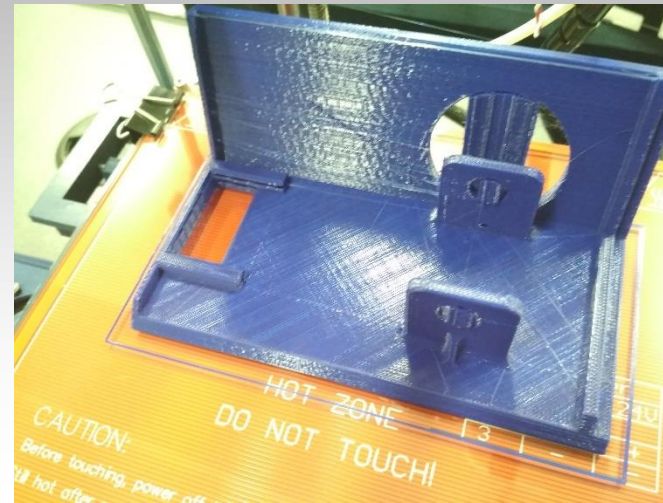
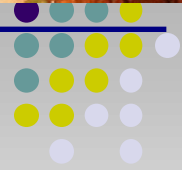




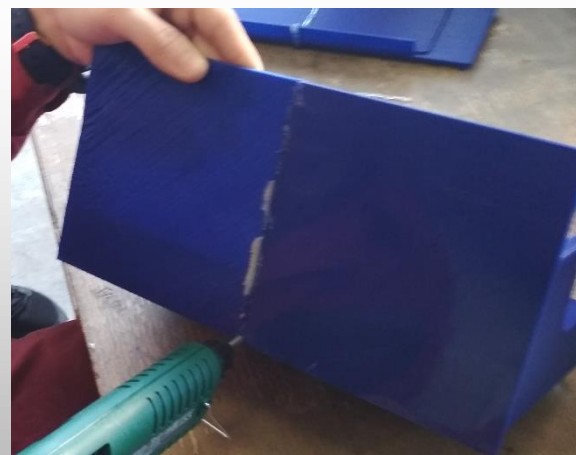
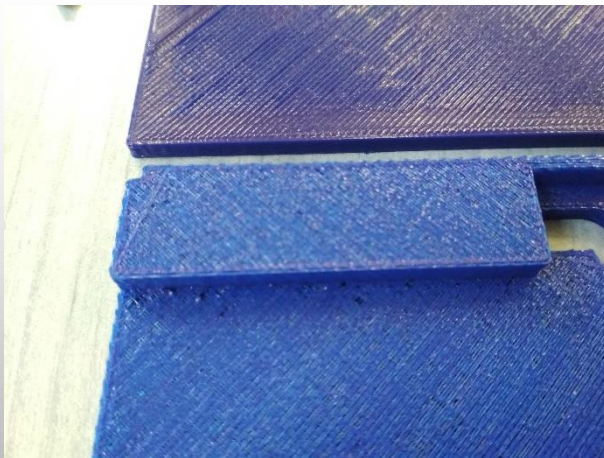
Discs with embossed letters: Printing, Cleaning, Painting



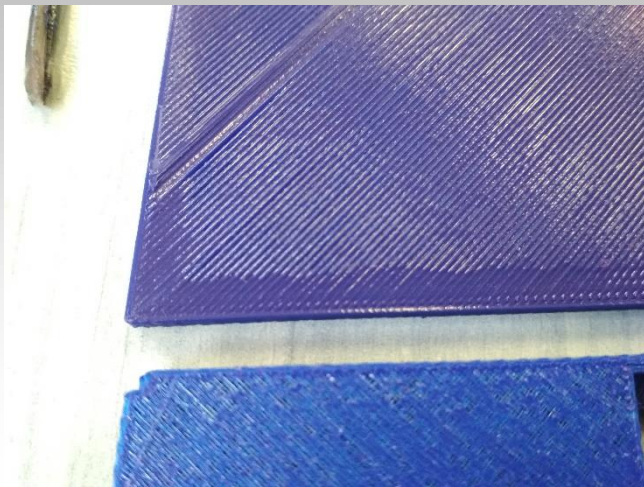
Discs with letters: Coating



Printing parts of the panels



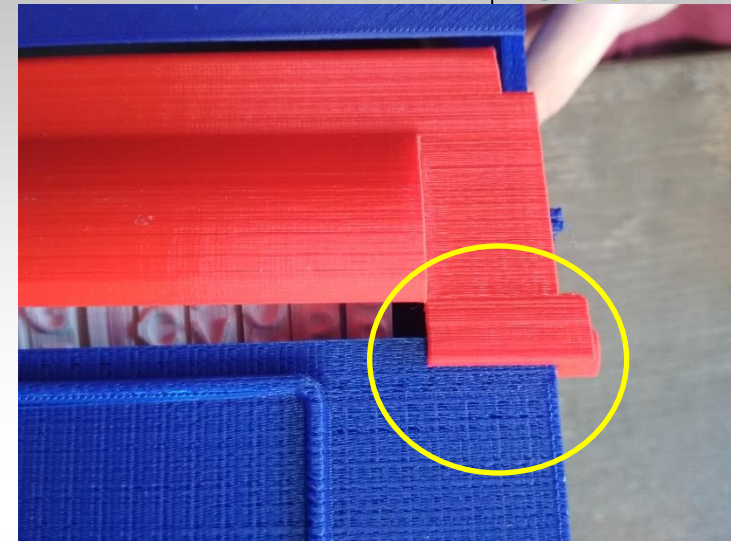
Assembly by gluing the device panels



Structure differences on the lateral panel caused by malfunction of the 3D printer



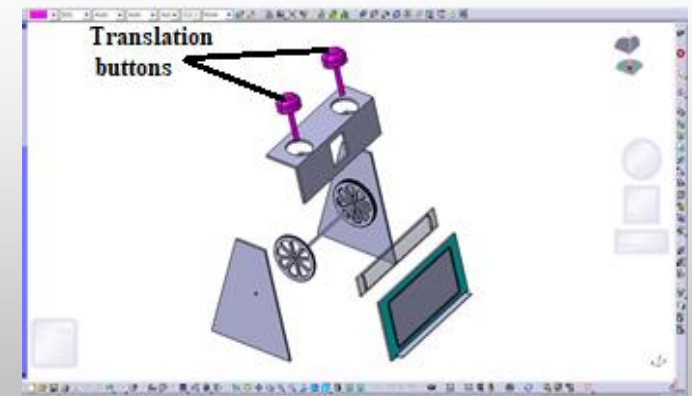
Teflon guide overheated and blocked



Missalignment after assembly the two lateral panels parts



Overhangs causes poor layer adhesion, bulging and curling on the surface



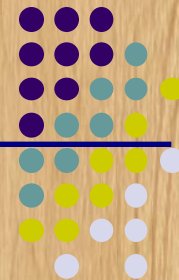


The advantages of 3D printing for **READ-WRITE DIDACTIC EQUIPMENT** :

1. Flexibility of changing details in the production of the final element based on 2D and 3D model.
2. Elements with complex geometries are easier to be obtain through 3D printing and didn't need special production stages.
3. Mechanical resistance can be improved modifying the filling degree, the design or even the plastic material.

Acknowledgements

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Thank You!

