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How 3d Printing Has the Ability to Revolutionize Production and Why it Hasn't

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How 3d Printing Has the Ability to Revolutionize Production and Why it Hasn't

Roy Colter '18

Professor M. Jareb, Professor A. Moras

"3d printing has the ability to shake up many manufacturing industries but factors such as its complexity, price and learning curve are holding it back."



What is 3D printing?

A form of **Additive manufacturing**: A processes in which material is joined or solidified to create a three-dimensional object, with material being added together.

3 most common 3d printing technologies

FDM: uses heat to fuse together layers of a thermoplastic polymer to create an object.

Cheapest most readily available.

SLS: uses a high-power laser to fuse small particles of polymer powder.

SLA: uses light to cure a photosensitive liquid to form a solid. Highest quality

Materials:

Thermoplastics: ABS, PLA, PETG, ASA, TPU

Metals: gold, aluminum, titanium

Machines that uses to cost thousands of dollars and were as large as a fridge are being out performed by machines that cost hundreds of dollars and fit on your desk → increased access to powerful, creative technology

Don't want to own a printer? Use a printing service
- Shapeways

Creation of a product:

Idea → Study → Design → **Prototype** → Test → Iteration → ...Finished Product

What is rapid prototyping?

Rapid prototyping is a group of techniques used to quickly fabricate a scale model of a physical part or assembly using three-dimensional computer aided design data.

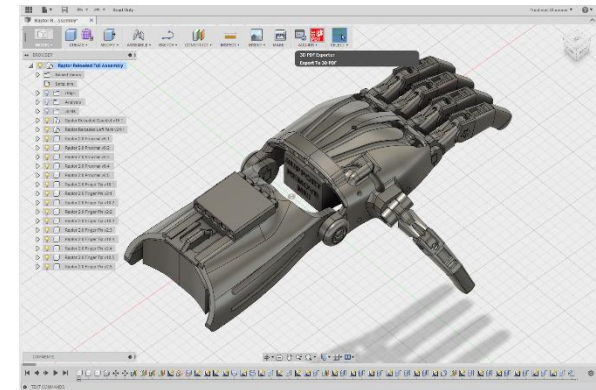
Benefits of 3d printing

- Small batches of goods to be produced for a relatively low cost
- Rapid prototyping
- Allows a high level of variation amongst iterations
- Personalized products
- Tests are performed on prototypes to uncover faults in a products design

Result: 3d printers can vastly reduce unit cost and lead time while increasing part performance.

What is holding 3d printing back?

- Skill needed to design objects
- Price of higher quality printers
- Education of the youth about 3d printing
- Long build time compared to mass manufacturing



Autodesk Fusion 360

Credit: Google images

About this printer:

Power spec 3D Pro

Printing type: **FDM**

Maximum build size: 8.9" x 5.7" x 5.9"

Price: **\$800 (when first purchased)**

Materials: **ABS, PLA, ASA, TPU, PETG**

Minimum layer height: **.1 mm**

Maximum layer height: **.5 mm**